THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE—SEPTEMBER, 1947

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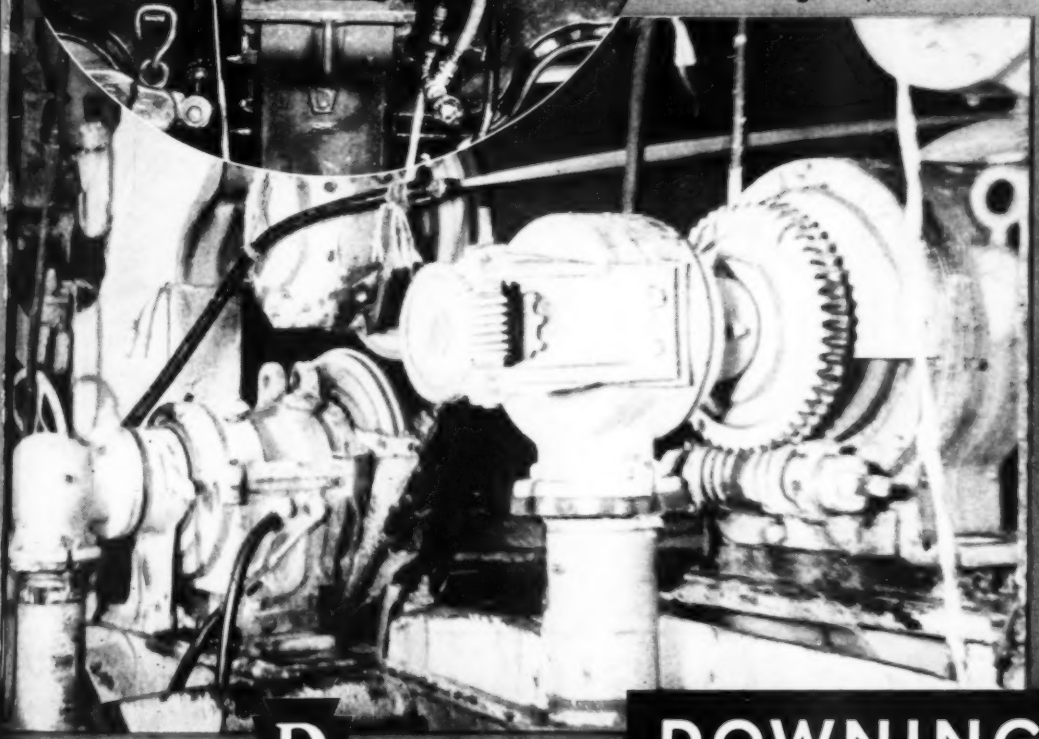
DETROIT

OLDEST MANUFACTURER OF MODERN SUCTION ROLLS

Photo in circle shows a modern Downingtown Suction Press Roll with suction connection thru a hollow leg at the front end. Picture below shows two pioneering designs of Downingtown Suction Presses which were installed 21 years ago at Scott Paper Co., Chester, Pa. These rolls are running today. Scott Paper Co. ordered their first Downingtown Suction Press in 1925. They now have 11 in operation.... Downingtown Mfg. Co., Downingtown, Pa.



Most Complete Line of

SUCTION ROLLS

Suction Couch
Suction Press
Suction Felt Cleaning
Suction Extractor
Suction Drum
Suction Cylinder Couch

D

DOWNINGTOWN

Designers & Builders
Paper Making Machinery

Where wet strength counts—

High wet strength of UFORMITE-treated paper is graphically shown by the fact that this paper bag when filled with water does not break even on prolonged soaking.

Photo courtesy Union Bag and Paper Company.

—count on UFORMITES 467 and 470 to do the job efficiently, economically!

Paper bags are just one of many applications where wet strength is of prime importance . . . and in which you can rely on the UFORMITES to give you superior wet strength efficiently and economically.

UFORMITE 467 is particularly designed for use with Kraft by beater addition. UFORMITE 470 is recommended for sulfite stocks—can be used effectively with Kraft, rag and groundwood —in stocks where low acidity is important.

Neither UFORMITE 467 nor UFORMITE 470 affects the color, odor or taste of paper. No special handling is needed . . . no special equipment is required to prepare these urea formaldehyde resins. And—as little as 1% resin solids on dry fibre weight will increase wet strength by as much as 300%!

In addition to giving your paper high wet strength properties, UFORMITE 467 and UFORMITE 470 will improve dry tensile and Mullen, fold, uniformity of sizing, and coating surface characteristics. Why not improve the quality and value of your paper at low cost? Write for full details.

UFORMITE *is a trade-mark, Reg. U. S. Pat. Off.*

Represented by Cia. Rohm y Haas, S.R.L., Carlos Pellegrini 331, Buenos Aires, Argentina and agents in principal South American cities

THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Important link

Boring and turning a roll head on a turret lathe is one of the preliminary operations in the Beloit shop. The semi-finished casting you see here will be a star performer when it has been precision-finished and assembled with the other parts of a modern paper machine. The operator is Laurence Schill, a skilled machinist who learned his trade in the Beloit shop. *Beloit Iron Works, Beloit, Wisconsin.*

BELOIT

PAPER MACHINERY

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS. U.S.A. ·

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Fairbanks-Morse Pomona Vertical Turbine Pumps: Oil or water lubricated, with open or closed impellers—you can "figure" the right one for you.
Fairbanks-Morse Centrifugals: The broadest line, for widest variety of centrifugal pumping service.
How Do You "Figure" a Pump?...
"Figuring" a pump is engineer-talk for the slide-rule work necessary before deciding on the type and size of pump required to do the job at hand.
It's not easy: it involves the skilled use of almost every hydraulic formula. Equally important, it demands a familiarity with pumps and pumping problems that is broad enough to prevent oversight, deep enough to assure an answer that's right.
Before you "figure" your pumps, have a talk with your Fairbanks-Morse dealer or the pump engineer from your Fairbanks-Morse branch office. If there's a way for you to save money and gain real pumping satisfaction, they'll know how to "figure" it.
Westco Turbine Pumps: Built with extreme accuracy for high-head pumping of almost every liquid.
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A name worth remembering
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

VESSEL

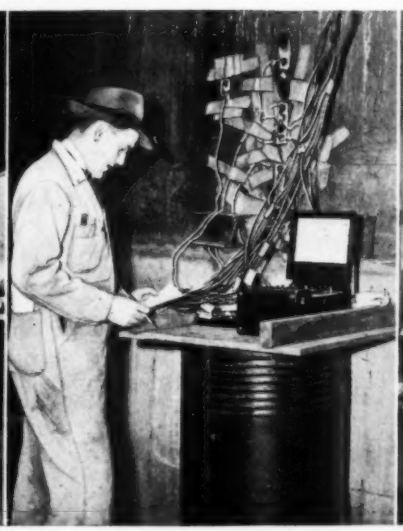
NEWS

A. O. SMITH

Corporation

THE WIDE WORLD IS OUR SHOP. Gone are the days when all pressure vessels had to be fabricated in the shop, in order to achieve satisfactory quality control. Today, with A. O. Smith Field Welding Specifications, and with an A. O. Smith Field Welding Supervisor on the spot, shop quality can be accomplished and assured anywhere around the world.

BOSS MAN. The Chief Inspector is the only member of the Vessel Division whose decisions cannot be overruled. Here he checks a 24-hour recorder on a heat exchanger tube bundle under test at 1850 psi.



NO GUESSING GAME! Stress analysis during fabrication, even when vessels are erected in the field, is a standard A. O. Smith procedure at critical points where calculation is difficult.

ARE DRAFTSMEN HUMAN? Vessel Division's new air conditioned headquarters is a dream come true to the drafting crew, without whose patient skill no pressure vessel could ever be built.

"In my business, we could use more caustic soda, soda ash and sodium bicarbonate than we're getting . . . and that goes for liquid chlorine, too. But at least we know where we stand. Mathieson took the trouble to explain the whole story to us—why there's a shortage of these important heavy chemicals . . . what to expect in the way of increased supplies in 1947 and 1948. Mathieson always works with us . . .

. . . and that's why we like to do business with Mathieson!"*

**The foregoing is based on reactions to our advertisement—"Why you can't buy all the Caustic Soda, Soda Ash, Sodium Bicarbonate and Chlorine you want"—which appeared in many publications earlier this year.*
The Mathieson Alkali Works (Inc.),
60 East 42nd Street, New York 17, N. Y.

Mathieson
CHEMICALS

Caustic Soda . . . Soda Ash . . . Sodium Bicarbonate . . . Liquid Chlorine . . . Chlorine Dioxide . . . Ammonia, Anhydrous & Aqua . . . HTH Products . . . Fused Alkali Products . . . Dry Ice . . . Carbonic Gas Sodium Chlorite Products . . . Sodium Methylate

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

VOLUME 29 - - - - - SEPTEMBER, 1947 - - - - - NUMBER 6

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No single type of dryer felt will meet the needs of all mills. But HOOPERWOOD "Canvas Engineering" has the answer to that problem—a specific HOOPERWOOD Dryer Felt for each requirement.

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Mill Superintendents find this service invaluable in suiting the particular requirements of their mill—even down to each machine position if desired.

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Mills: WOODBERRY, BALTIMORE, MD.

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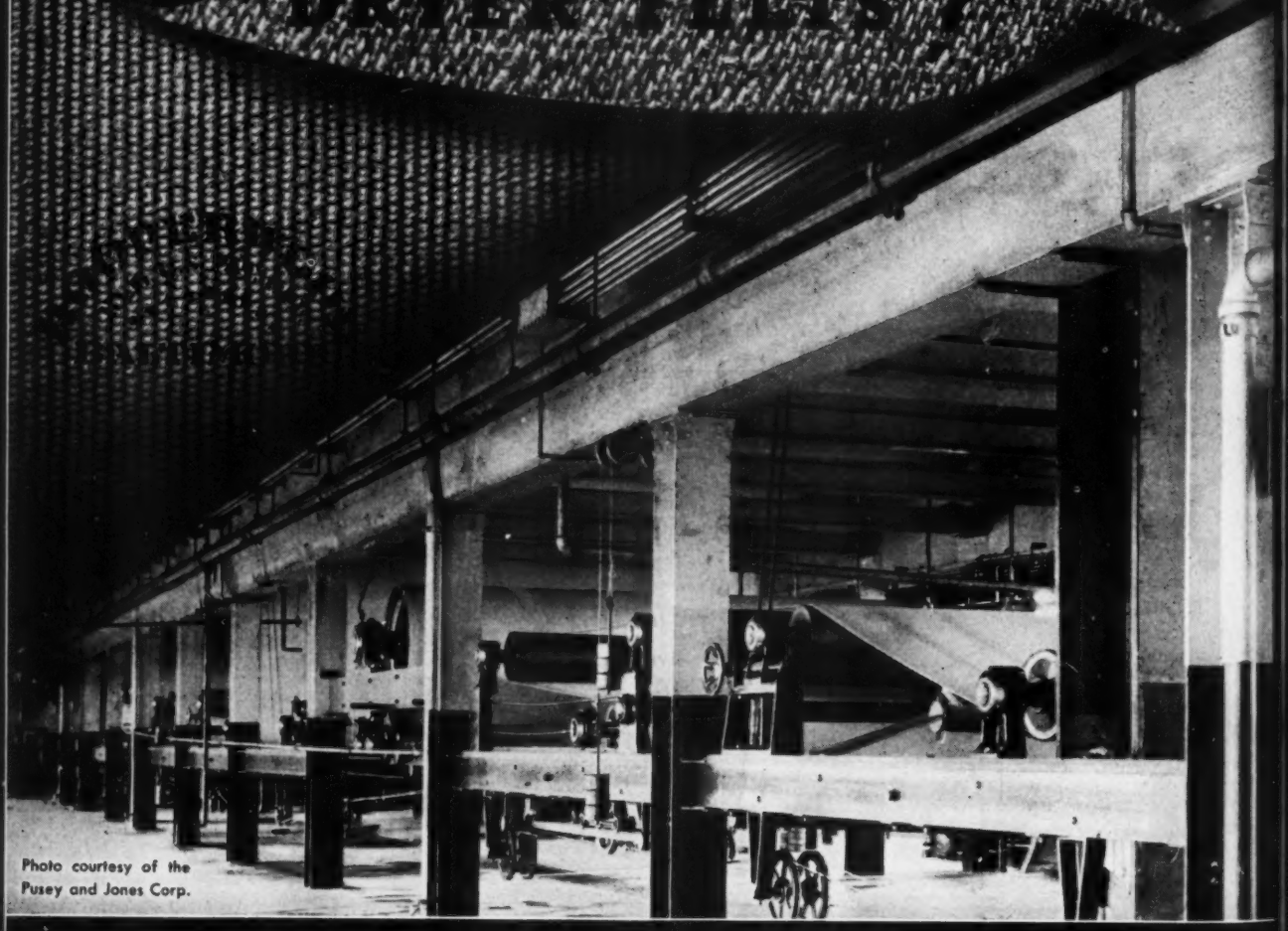
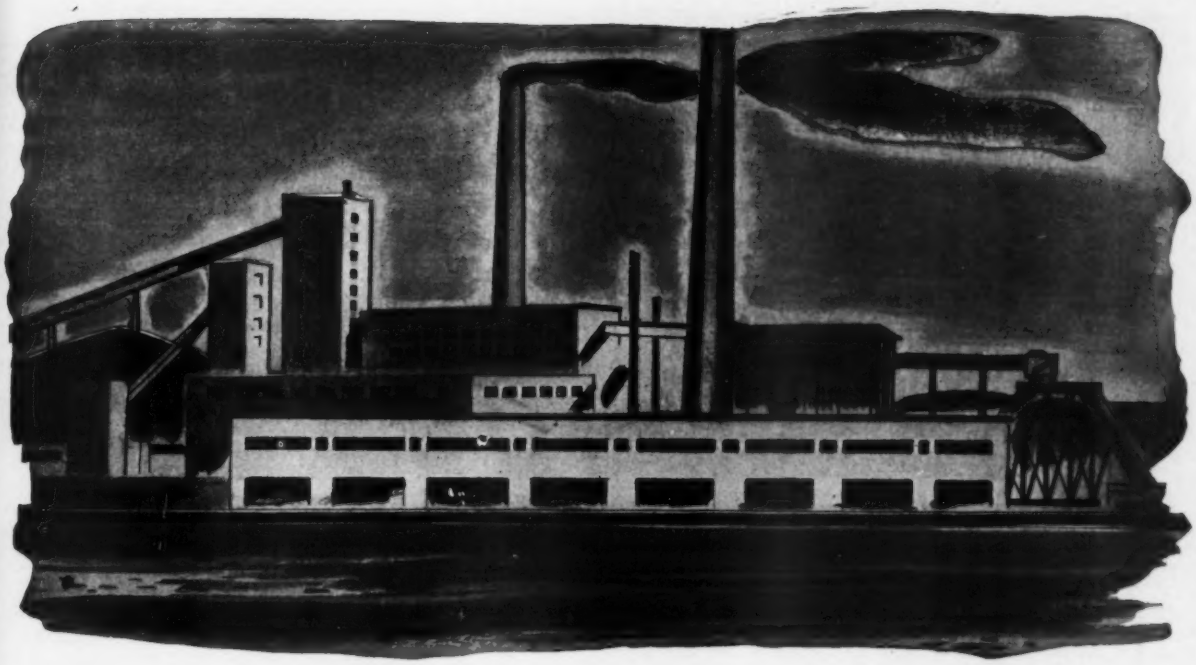


Photo courtesy of the Pusey and Jones Corp.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS



WHAT GOES ON IN THIS PAPER MILL...

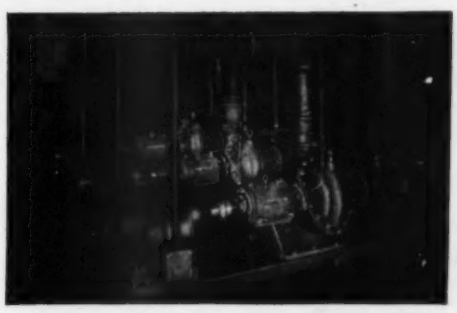
in addition to making paper?

Many paper mills today are *also* turning out chemical by-products of wood . . . such as tall oil, alcohol, resins, turpentine used in the manufacture of soaps, plastics, paints — to name a few. What new kinds of by-products will be made in paper mills of the future can't be said for sure right now.

What *is* certain is that the processing of chemical by-products calls for the right pumps — often specially-developed pumps — such as Worthington builds now . . . and *will* engineer to solve your future problems.

Worthington P.A.E.'s* offer the most in experience and know-how of pump application for all types of pulp and process problems. Worthington offers all types and sizes of centrifugal pumps to *overcome* these corrosion, abrasion, heat viscosity and solidification problems. If you need the right pumps now . . . or will need them, you'll learn that *there's more worth in Worthington* by phoning our nearest office or writing to — *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

*P.A.E.—Pump Application Engineer.



3 of 6 Worthington thin Black Liquor Pumps in the Diffuser House of the North Carolina Pulp Company, Plymouth, N. C.

WORTHINGTON

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Steam Power Rotary Vertical Turbine Centrifugal

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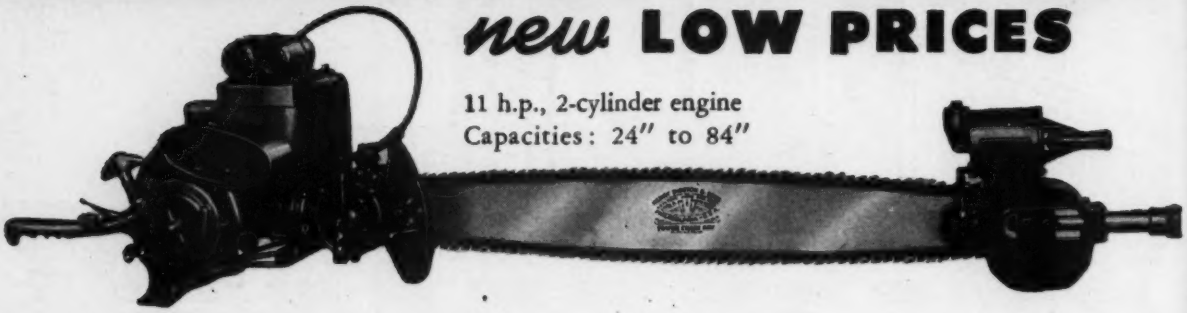
with Mercury Gasoline Engine



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11 h.p., 2-cylinder engine
Capacities: 24" to 84"

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Among these features are an 11 h.p., 2-cylinder engine; a positive-acting, non-slip, multiple-disc clutch; a detachable air cleaner which keeps dust from carburetor; die-cast engine cylinders and cooling fan; gear driven magneto; fuel filter built in tank; a tough, cutting chain of Disston Steel which maintains perfect contact with drive sprocket under all load conditions.

The Disston Chain Saw is a product of Disston saw-making skill and dependability. It's a typical example of the economy of Disston quality. Thousands are now in use on operations of many kinds—in the forests; on railroad contracting, and tree service jobs; at shipyards and manufacturing plants—wherever there are heavy timbers to cut.

DISSTON CHAIN SAW

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A powerful, light weight, air-driven saw that is speeding up timber cutting and reducing costs for general contractors, railroads, shipyards, and many other users. It requires no previous experience to operate, and can be used in all climates and weathers . . . even under water.

Gear housing and saw mechanism may be rotated in either direction for vertical or horizontal cutting. Equipped with heavy-duty, vane-type motor specially engineered and produced by Chicago Pneumatic Tool Company for use on Disston Chain Saws. Requires little maintenance as it is built for long, economical service.

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Enables you to do your own sharpening . . . quickly, easily, accurately. Keeps chains in first class condition.

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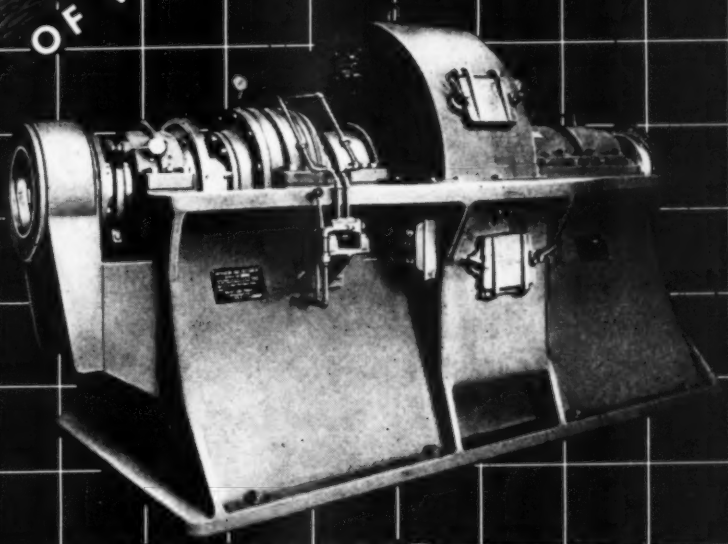
MORE PULP PER POUND

MORE PULP PER POUND



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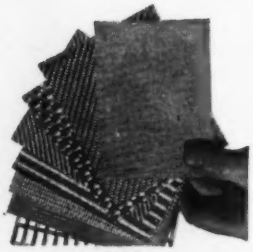

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Wire cloth of Monel*, Nickel or Inconel* cuts down trouble in screening and filtering.

For these are the "task metals" of industry. They're rustless . . . corrosion-resisting . . . strong . . . tough. They stand abrasive wear. Your product is safe from contamination at all times.

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If you don't know a wire cloth weaver, send for our booklet: "ESTABLISHED WEAVERS OF MONEL, NICKEL AND INCONEL WIRE AND FILTER CLOTH."

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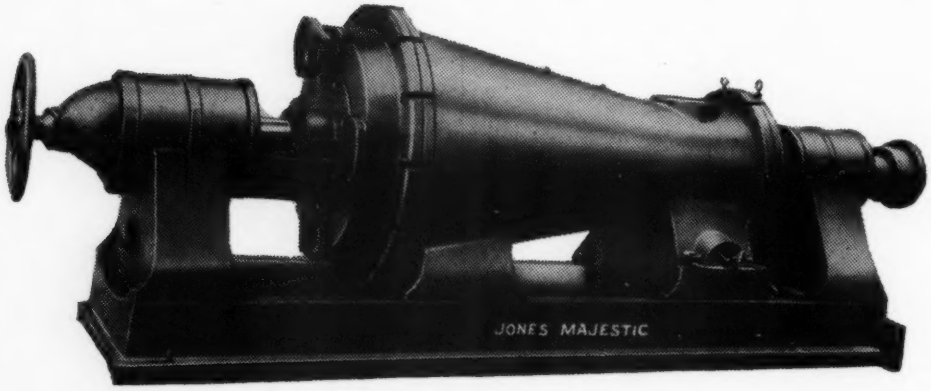

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Builders of Quality Machinery for Paper Mills

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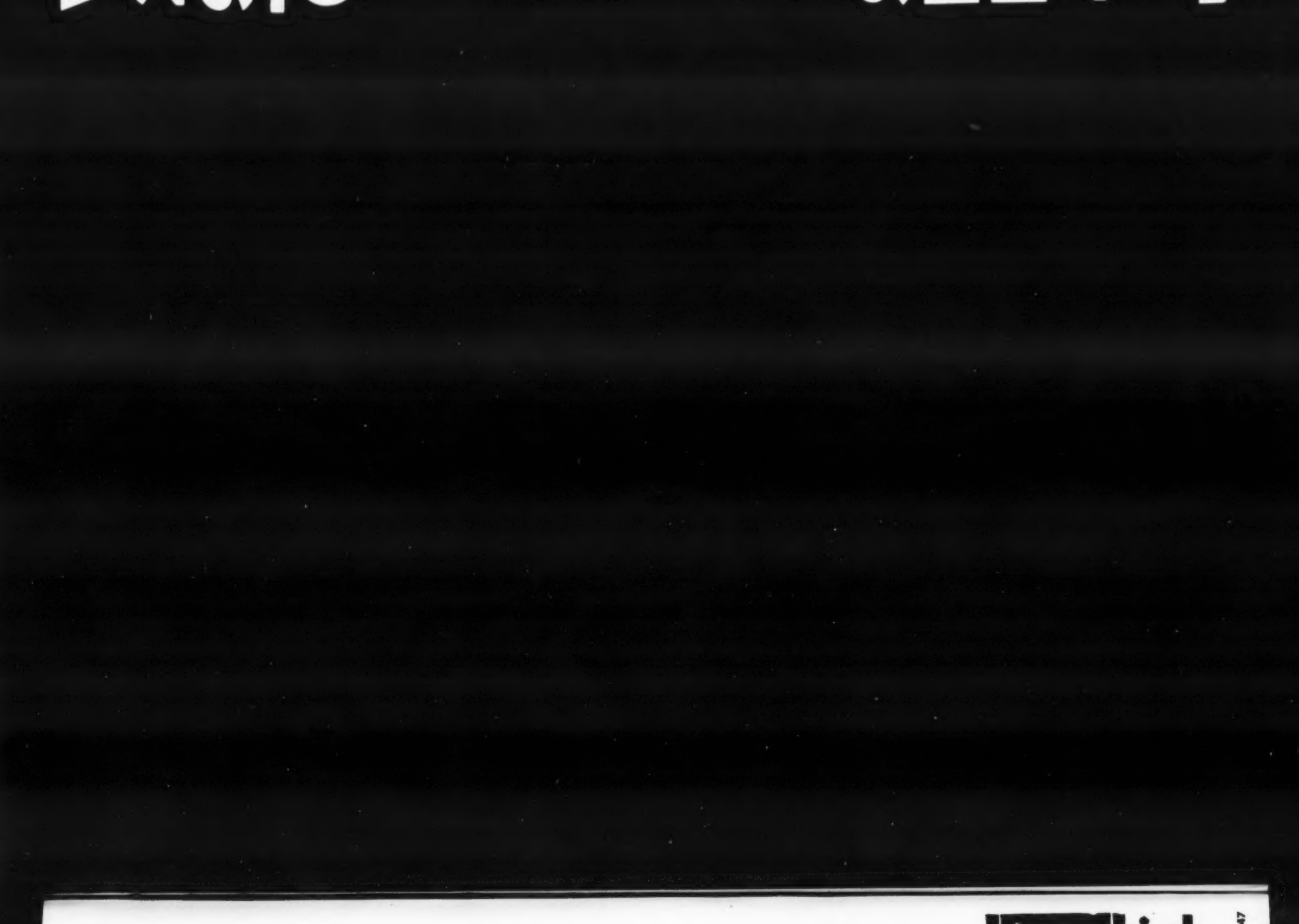

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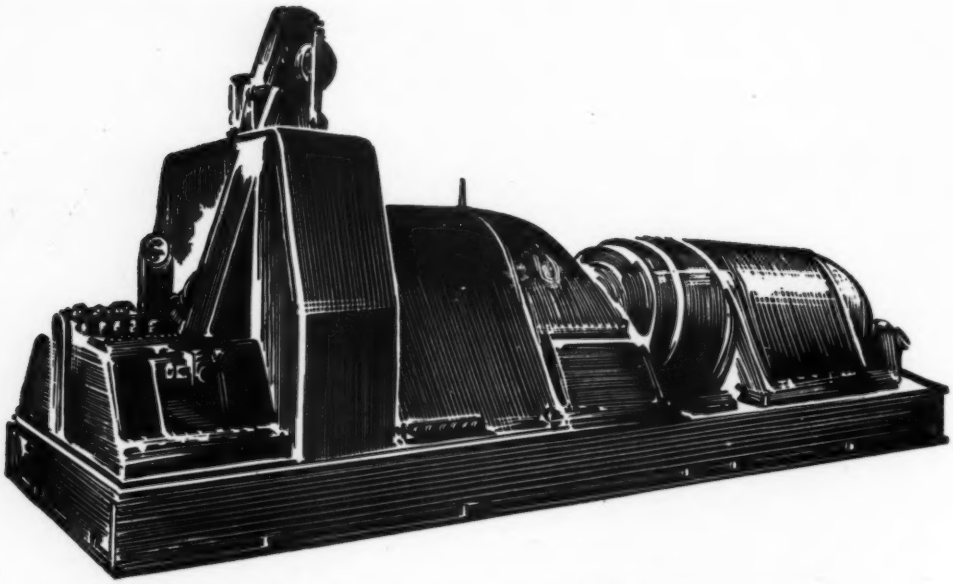

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Wherever steam also is required in appreciable quantities for heating or processing, power can be produced at surprisingly low cost with a turbine designed for extraction or back pressure service. Often the cost of the small amount additional fuel required to produce power is so low that the entire equipment investment can be repaid in a few years' time.

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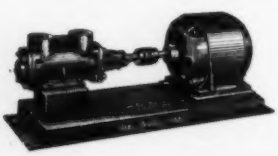

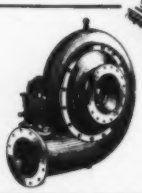

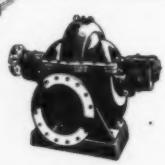

T-11

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. . . 2% of this product is dispersible and stable in 5% sulfuric acid and in 4% sodium hydroxide solutions . . . further its detergency is not impaired by these solutions or by other alkaline or dilute acid mediums . . .

This product is worth thinking about—and trying—because your felt life can be prolonged up to 20%—a truly worth-while lease on felt life!

The name of this new and different felt-scouring compound is . . . SYNTERGENT*K

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*Reg. U.S. Pat. Off.

SYNTERGENT K
NEW, IMPROVED FELT-SCOURING COMPOUND

Photo Courtesy of Whippany Paperboard Company, Whippany, N. J., April 27, 1947

How much is a valve worth?

Fig. 1259—125-pound All Iron Swing Check Valve with bolted flanged cap, flanged ends and regrindable, renewable iron disc. Disc, when wide open, permits full, unobstructed flow through valve body.

Fig. 457—125-pound All Iron Globe Valve with flanged ends, bolted flanged yoke, outside screw rising stem and regrindable, renewable iron seat and disc.

Fig. 1816—125-pound All Iron Gate Valve, with flanged ends, bolted flanged yoke, outside screw rising stem and taper wedge solid disc.

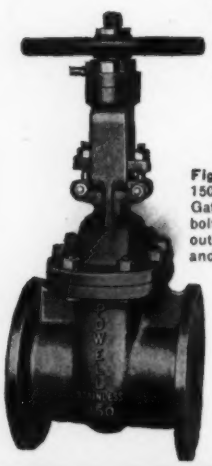


Fig. 2453-G—New, standard 150-pound Stainless Steel Gate Valve with flanged ends bolted flanged yoke-bonnet, outside screw rising stem and taper wedge solid disc.

The $64 question is not "what is the price of the valve," but "how much is it worth?"

And the measure of its worth is "will it do the job, how long will it give satisfactory service, and what will be the ultimate cost of maintenance?" For in addition to the cost of labor and materials in maintaining a valve, don't lose sight of the serious loss in production while a valve is "down" for repairs or replacement.

The Powell Line is so complete* that there's always a Powell Valve specifically adapted to do the job. Powell Valves are noted for long-life, satisfactory service. Powell Valves are designed to reduce maintenance and shut downs to a minimum.

*The Powell Line includes Bronze and Iron Valves of every required type, design, size and pressure; Cast Steel Valves of every type, in pressure classes from 150 to 2500 pounds; and, for the chemical and process industries, a complete line of Corrosion-Resistant Valves in the widest range of pure metals and alloys ever used in making valves.

Powell Valves for handling black liquor, white liquor, green liquor, etc., are available in all iron, iron body with bronze trim and iron body with special alloy trim.

The Wm. Powell Company
Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

Turbine gears like new after 25,500 hours with

NONPAREIL
TURBINE OIL

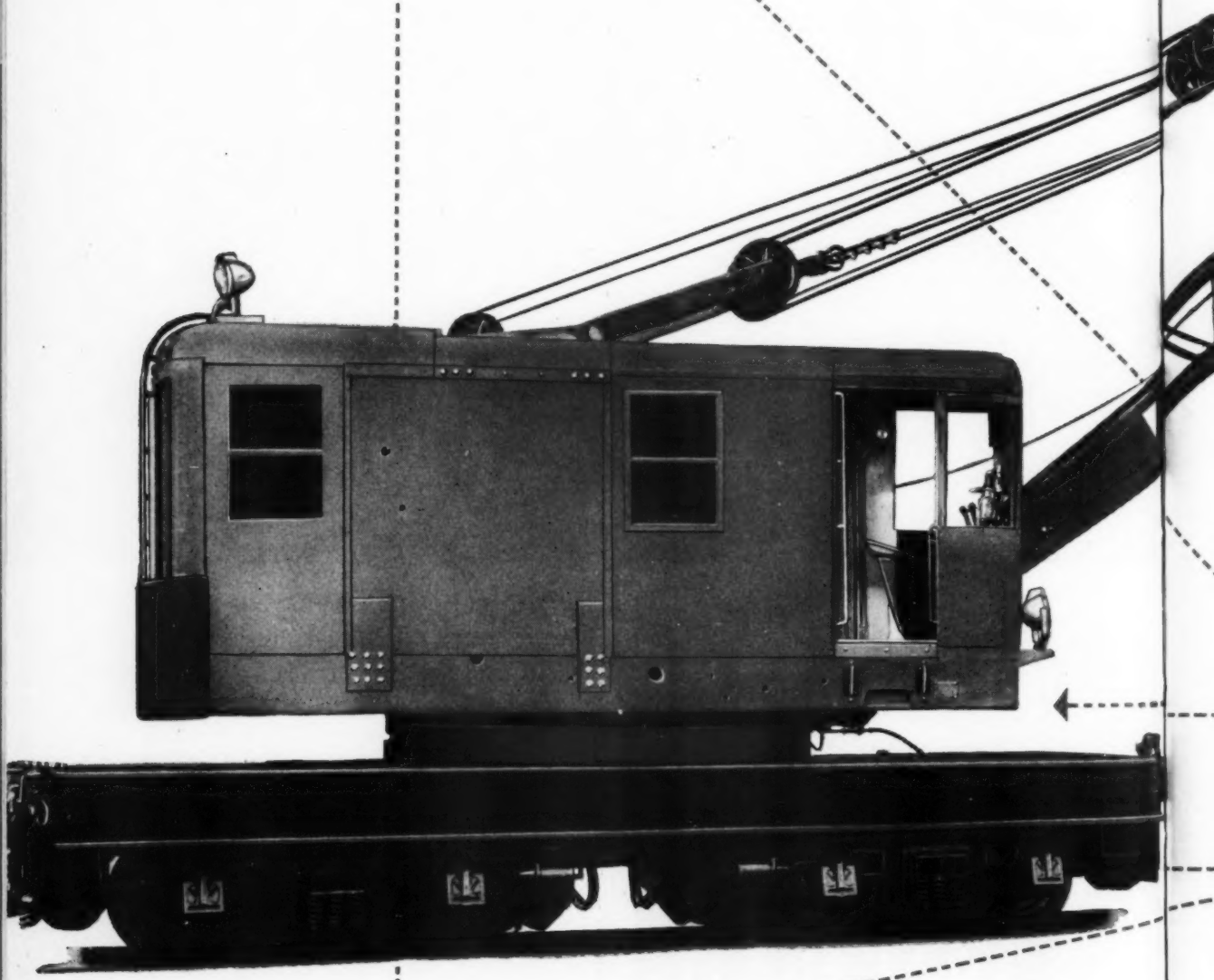
TAKE a close look at this unretouched photograph of the gears in a 5000 KW geared turbine. It is hard to believe they aren't new. Yet they operated 25,500 hours during the war in an English paper mill. They were lubricated by the same oil that was used on the turbine bearings—Nonpareil Turbine Oil.

Not only was wear reduced to the minimum but the oil system was completely free from deposits. Oil acidity at no time exceeded the extremely low neutralization number of 0.07mgKOH/gm. The oil required neither treating nor sweetening.

Nonpareil assures protection against acidity, deposits and corrosion for gears, bearings, governors and turbine oil systems. Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

A *revolutionary* LOCOMOTIVE CRANE



DIESEL-ELECTRIC LOCOMOTIVE CRANE. PATENT NO. 2083480
TOUCH CONTROL. PATENT NO. 2370856

THE AMERICAN

DIESELECTRIC

Climb into the cab of this new locomotive crane . . . and feel *diesel-electric* power at your fingertips!

First, travel the crane along the rails. Feel the smooth surge of *electric* power driving the wheels—power that delivers maximum torque for heavy-pull starting—power that never jerks.

Now swing the boom and pick up a load. Here you feel direct *diesel* power at work . . . tremendous energy managed by precise air controls.

The American Dieselectric is not a converted steam crane, or gasoline crane. It is new in every part, from trucks to boom point . . . specifically created for the best utilization of diesel-electric power. Because of its tremendous work capacity and low upkeep, *it is one capital investment that "writes off" its own cost in 5 years.*

★ Would you like specifications, pictures, operating data? Write today for new illustrated catalog. AMERICAN HOIST AND DERRICK COMPANY, St. Paul 1, Minn. *Sales Offices:* New York, Chicago, San Francisco, Pittsburgh, New Orleans.

● *diesel* power to the deck...

● *electric* power to the trucks

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AMERICAN HOIST AND DERRICK CO.
71 South Robert Street, St. Paul 1, Minnesota

Please send_____copies of new locomotive crane catalog with details on the American Dieselectric.

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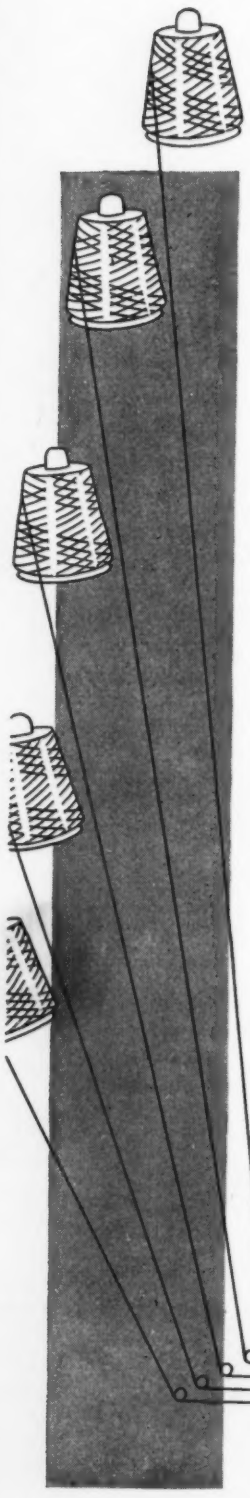
781

YEARS OF EXPERIENCE IN THE MAKING OF FELTS PAY OFF IN **LOWER COSTS TO YOU**



There is no substitute for experience in making paper—none in the making of felts for paper making. Your objective and ours are the same: you want to get the most out of the felt you use—the longest life possible and the lowest cost of operation. We want to supply you with the felt that will do both, and do it consistently.

To achieve our part of this program, we bring to the making of felt for you the experience of 56 years; the craftsmanship that has been handed down from father to son; the genius for selecting the virgin wools that will combine to give the greatest strength, the *tenacity* from which the name of our felts is derived: **TENAX.**

Experienced as we are, we continue to improve upon our practice just as you do. Recent reports of the performance of **TENAX FELT** in the full-out production of this postwar period confirm the fact that our research and development is paying off for our customers in longer service and lower costs.

LOCKPORT FELT COMPANY
NEWFANE, N. Y.

TENAX
"TENAX FELTS ARE TOUGH"

SERVING THE PAPER INDUSTRY SINCE 1891

WE TORTURE OUR CASTINGS

—to learn how to make them stronger for you

Endless research in Brake Shoe testing laboratories assures greater tensile strength—higher yield point—lower coefficient of friction—more wear resistance—better performance when you specify

N • B • M BRONZE PARTS

We put more service into them—
you get more service out of them.

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{ BETTER BRONZE PARTS

NBM

AMERICAN **Brake Shoe** COMPANY

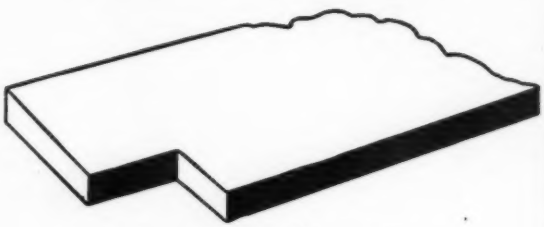
NATIONAL BEARING DIVISION
ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Nebraska*



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

- LARGE SOURCE OF FARM PRODUCTS
- LEADER IN DAIRY PRODUCTS
- MAJOR LIVESTOCK PACKING AND PROCESSING CENTER
- AMPLE WATER SUPPLY
- NATURAL GAS, COAL, OIL AND ELECTRIC POWER
- RICH MINERAL DEPOSITS
- DIVERSIFIED INDUSTRIAL ACTIVITY
- STRATEGIC DISTRIBUTION LOCATION
- EXCELLENT RAIL TRANSPORTATION
- SKILLED, FAIR-MINDED LABOR
- NO SALES OR INCOME TAX

Industries engaged in the packing or processing of farm products find Nebraska a rich source of raw materials. Corn, grains, sugar beets, potatoes and other vegetables are grown in abundance.

Omaha is a leading meat packing and poultry processing center. It frequently leads the nation in livestock receipts, is located in the world's largest butter producing area, and houses the nation's second largest industrial alcohol plant.

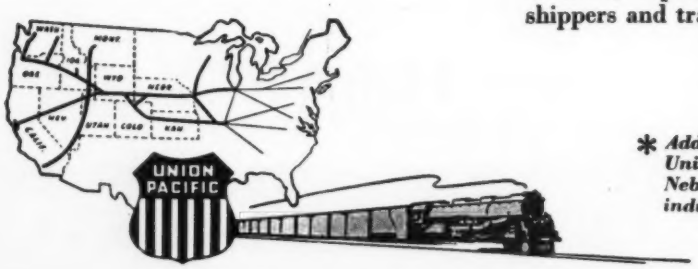
In addition to agricultural activity, there is diversified industrial manufacturing such as farm machinery, air conditioning equipment, fabricated steel, brick and tile.

Nebraska has large mineral deposits; gypsum, salt, potash, sand, gravel, stone, etc. Natural gas, petroleum and coal are readily available.

Of particular interest to industry is Nebraska's "pay-as-you-go" policy; no state sales, income or luxury taxes. It is a good place to work and live.

* * *

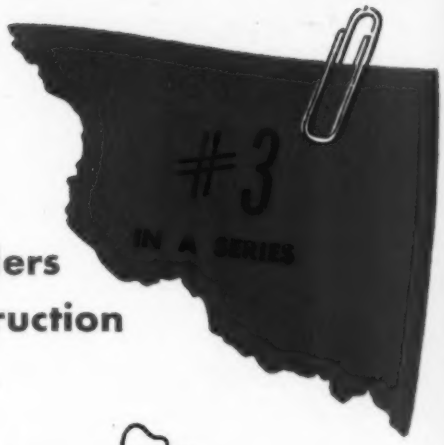
In Omaha are the headquarters of the Union Pacific Railroad which provides efficient, dependable transportation for shippers and travelers.



* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE



Moving forward with America's leaders in a mighty era of construction to build a greater America . . .

KIMBERLY-CLARK INSTALLATION PLACED IN McGRAW HANDS

HARTFORD, CONN.—The Kimberly-Clark Corporation has awarded a contract to F. H. McGraw & Company, engineers and constructors of this city, for machinery installation at Memphis, Tenn. According to F. H. McGraw & Company, the Kimberly-Clark Corporation has in the past performed such mechanical installation with its own forces. This contract calls for the installation of two crepe wadding machines and auxiliaries, plus all necessary electrical, piping, sheet metal and insulation work.

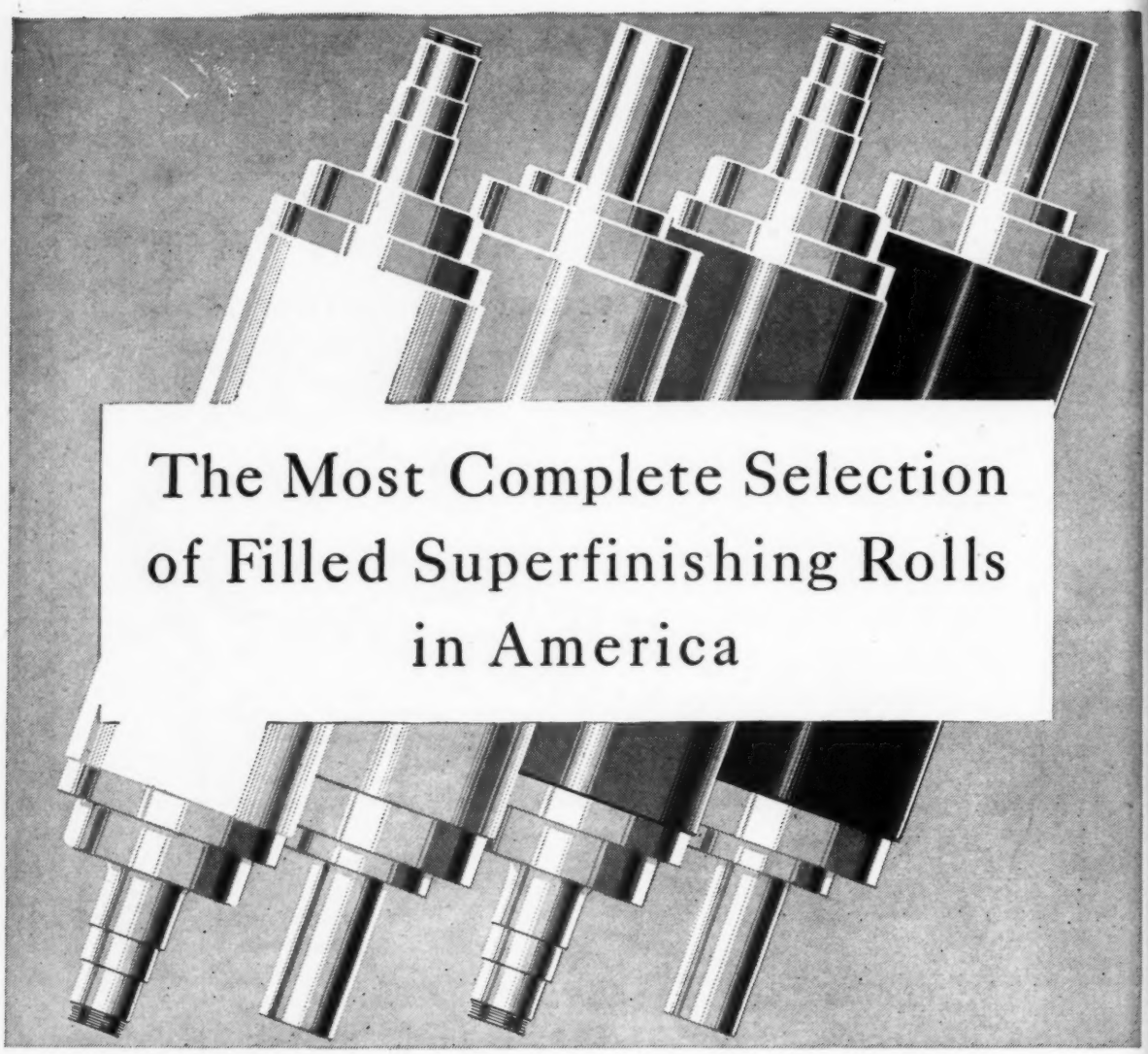
Reprinted with permission from "Paper Trade Journal," June 19, 1947

F. H. McGRAW & COMPANY

ENGINEERS AND CONSTRUCTORS

780 WINDSOR STREET · HARTFORD 1, CONN.

NEW YORK, N. Y. CHICAGO, ILL. · GARY, IND. MIDDLETOWN, O. · PITTSBURGH, PA. · ST. LOUIS, MO.



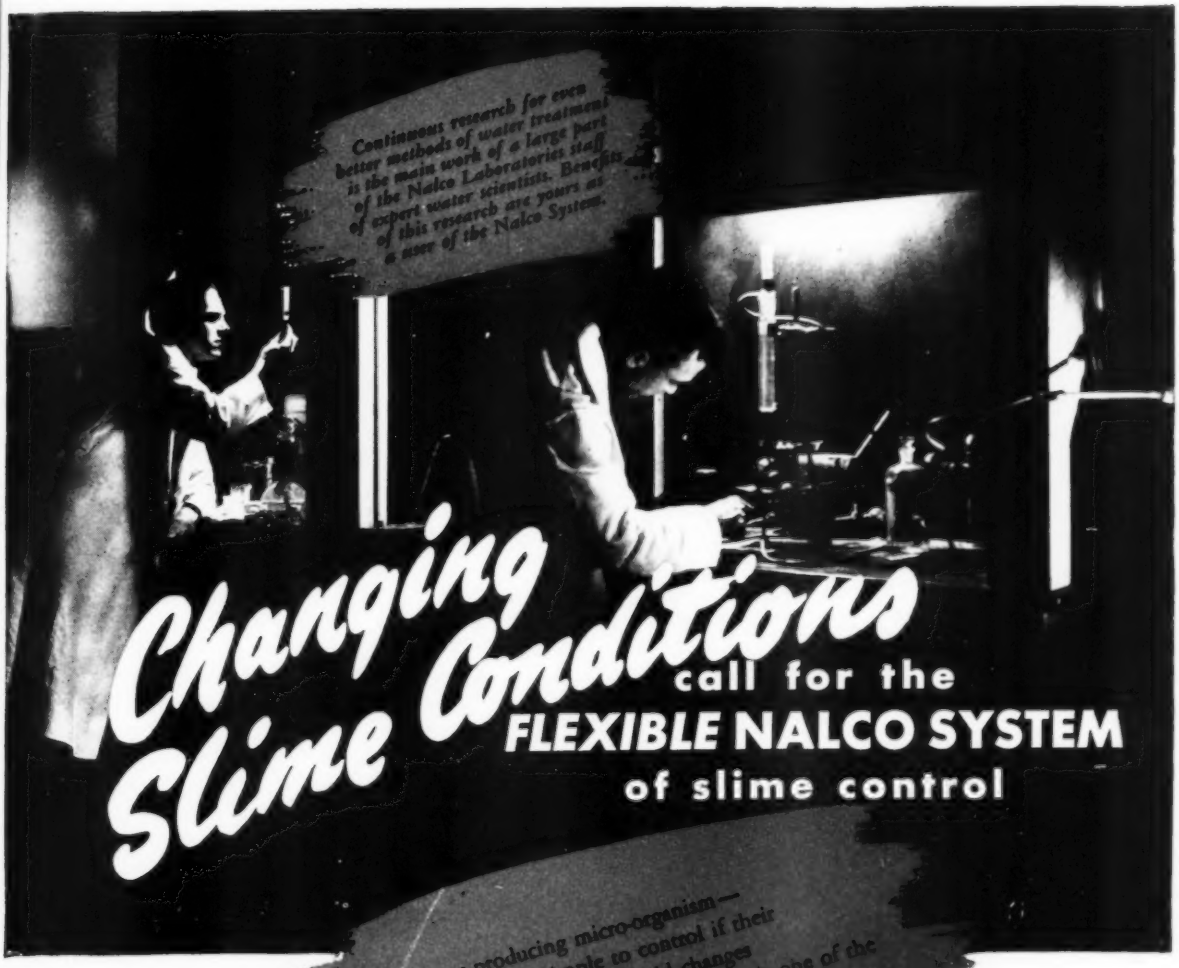
The Most Complete Selection of Filled Superfinishing Rolls in America

APPLETON

Supercalender Rolls

COMPLETE
SUPERFINISHING
EQUIPMENT
FOR THE PAPER INDUSTRY

THE · APPLETON · MACHINE · COMPANY
Pulp and Paper Mill Machinery · Superfinishing Equipment APPLETON · WISCONSIN
CASTLE & OVERTON, INC. · 630 FIFTH AVENUE · NEW YORK · N. Y.
PACIFIC COAST SUPPLY COMPANY SAN FRANCISCO · PORTLAND


Continuous research for even better methods of water treatment is the main work of a large part of the Nalco Laboratories staff of expert water scientists. Benefits of this research are yours as a user of the Nalco System.

Changing Slime Conditions call for the FLEXIBLE NALCO SYSTEM of slime control

ONE type of slime-producing micro-organism—or four—would be simple to control if their numbers remained constant. However, rapid changes in count and even character of slime producers is one of the principal reasons for failure of standardized, inflexible methods of slime control.

Nalco Slime Control takes into account the need for flexibility in pulp and paper mill water treatment—provides periodic laboratory reports to aid mill personnel in adjusting treatment to organism count and type . . . And sets up chemical treatment procedures to handle changes quickly and accurately.

Right now is the time to investigate the advantages of the flexible, efficient Nalco System for your mill. Write for the new Nalco Bulletin No. 36 on Slime Control —or call your Nalco Representative.

NATIONAL ALUMINATE CORPORATION
6232 W. 66th Place, Chicago 38, Illinois
Foreign inquiries should be addressed to Aluminate Chemicals, Ltd.,
355 Eastern Avenue, Toronto 8, Ontario.

Nalco

The Scientific System of Water Treatment for Pulp and Paper Mills

ESPANOLA

947

General view of headquarters camp 50 miles north of Espanola. Headquarters for West Branch Operational Division, one of four

Espanola Again Makes Newsprint to Ease Critical Shortage

▶▶▶ TEMPORARY RELIEF in the critical newsprint situation has come to the daily paper of a midwestern paper mill town. Through an arrangement with the Kalamazoo Vegetable Parchment Company (Kalamazoo, Michigan), newsprint now being manufactured on one of the paper machines at the Espanola (Ontario) plant of its associated company, KVP Company, Limited, is being shipped to the *Kalamazoo Gazette* (Kalamazoo, Mich.). This arrangement has been put into effect to help meet the present emergency. The first issue of the *Gazette* to be printed on Espanola newsprint came out on, August 27.

It will be recalled that the Espanola plant made newsprint when it was operated by the Abitibi Power & Paper Company, Ltd., prior to 1930 at which time it was closed down. The plant remained idle until acquired by the KVP company in 1942. Since that time, the once-idle plant has been completely rehabilitated and new equipment installed. About a year ago, the modernization program was completed and the new plant went into production for the manufacture of groundwood, sulphate pulp and paper.

Ralph A. Hayward, president of the Kalamazoo Vegetable Parchment Co., Parchment, Mich., and also president of KVP Company, Ltd.

At the outset, the plant was a wartime project, acquired by the company largely to insure its own mills an adequate supply of pulp. But the heavy demand of the postwar world, and the vision of the company's leaders, have, in this emergency, temporarily adapted the production of this fine plant to meet the present need.

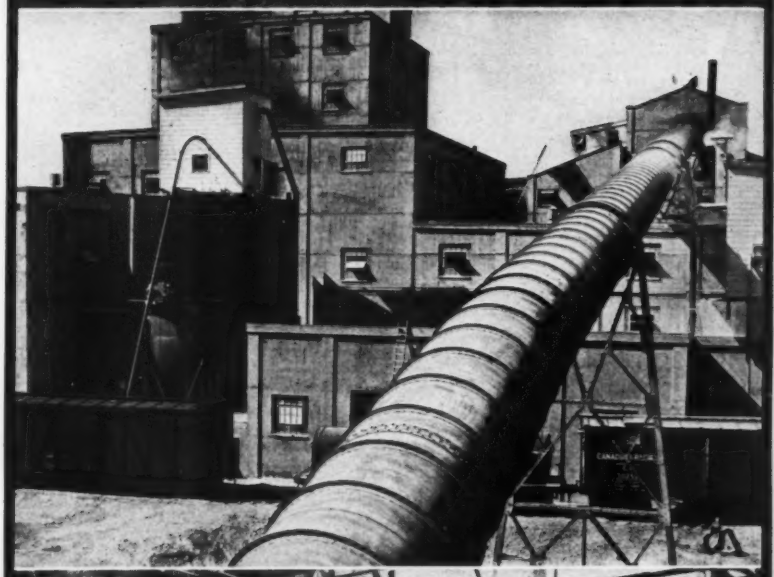
The technical skill and research that have gone into the development of the Espanola plant represent the best contributions of modern science and engineering skill.

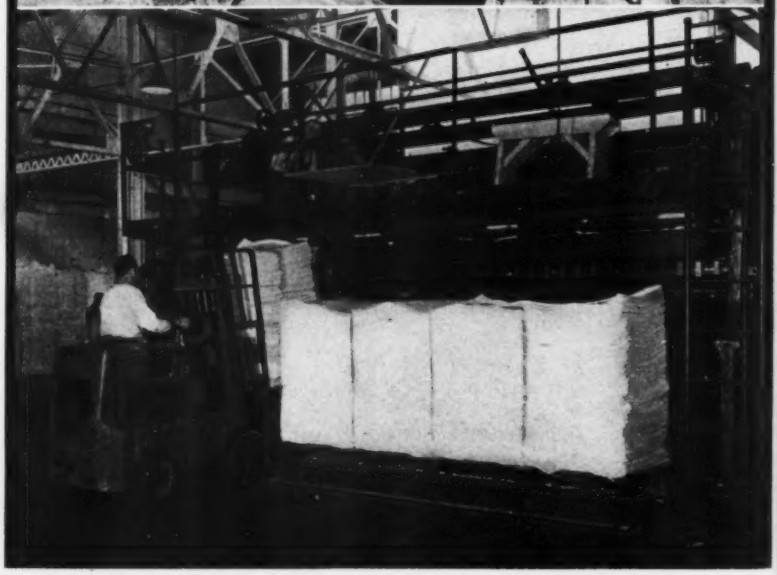
Timber concessions available to the company insure a practically inexhaustible supply of jack pine, which is pulped successfully by a special bleaching process with new equipment

Above—Men who helped to rebuild Espanola mill and who now are running the plant. Left to right: E. Norval Hunter, secretary of KVP Company, Ltd., and in charge of production; Harley MacDaniel, KVP home plant electrical engineer, in charge of power installation at Espanola; Thurston Iverson, kraft mill superintendent; Archie Hayes, paper mill sperintendent; G. M. "Scotty" Stewart, logging superintendent; Ralph A. Hayward, president of KVP companies, parent and subsidiary; Ben F. Avery, vice president and general manager, KVP Company, Ltd.

Center—Chip conveyor housing, taking chips from bottom of silos storage to top of digester

Below—Finished end of 160-inch Kamyr pulp dryer, largest ever built. This pulp goes directly to KVP in Parchment. Called "Bleachkraft" it is jack pine bleached by process perfected about ten years ago





installed. A fine grade of bleached pulp known as "Bleachkraft," is shipped direct to the KVP plant in Parchment.

The KVP Company Limited was officially incorporated April 1, 1946. Ralph A. Hayward, president of both the Kalamazoo Vegetable Parchment Company and the KVP Company Limited, has seen the realization of an idea that began when he spent a year at Espanola as resident engineer following World War I. The plant, then owned by the Spanish River Company, was turning out newsprint.

Following is a historical sketch of the plant at Espanola from its inception (Cf. P.I. and P.W. November, 1946):

History of Espanola

The KVP Company Limited is the third corporation to operate a pulp mill in Espanola. The original incorporation was in 1899 under the name of the Spanish River Pulp Company. The dam was built in 1901 and the pulp mill construction started.

The first groundwood was produced in September of 1905. The company store was opened in October of that year. In 1910 there was a reorganization of the company; the mill at Sturgeon Falls was consolidated with the Espanola plant.

The paper mill was built in 1911 and started in production in July, 1912, with two 166 in. Pusey & Jones machines. The hotel was built that same year.

In 1914 two 122 in. Rice, Barton & Fales machines were added to the

The illustrations used with this article appear through the courtesy of *The Kalamazoo Gazette*.

PAPER · · · America's 6th Industry

PAPER BAGS TO PACKAGE ICE

(NEWS ITEM: *Cubed, crushed or flaked ice is packaged and delivered to wholesale and retail customers in paper bags.*)

Ice cubes for room service . . . chipped ice for kitchen use . . . delivered in paper bags. These waterproof bags are made of different plies of paper with an inside liner of either waxed or wet-strength kraft. A specially-treated outer sheet possesses increased tensile and abrasive strength, assuring complete protection to contents. Paper bags for processed ice hold as high as 60 pounds of ice.

We will gladly give your name to the manufacturer to receive copy of a booklet describing this new paper product.

Paper sacks for open storage . . . "window" bags for perishables . . . paper bags for garbage disposal . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Among the new machines under construction by Puseyjones are three of the largest and fastest Fourdrinier Machines, one for white paper for bags, one for Kraft liner board, and one for Kraft paper for multi-wall bags; also one Cylinder machine of record size and speed for the manufacture of floor covering felt. Other machines are under construction for the manufacture of M. G. Kraft specialties, facial tissues, and high grade bristols.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

equipment. These machines were purchased from the Riverside Paper Company in Wisconsin.

During the first World War plans were made to enlarge the paper mill and two new Pusey machines were put in operation in 1919. Two new schools were also built to take care of the growing needs of the community.

Many new houses were built during the years of 1919 and 1920. The original homes were built of clay taken from the excavation of the power canal and made into brick in Espanola.

One of the major reasons for settling on the Espanola purchase dates back to 1917. In that year a young man just out of the University of Michigan started work in Espanola as the first resident engineer. At that time R. B. Wolf was manager of the Spanish River Company. Following the first World War he continued his association with Mr. Wolf in the consulting engineering field. His name is R. A. Hayward.

In 1924 he joined the KVP Company as general manager and became its president in 1936, succeeding Mr. Kindelberger (deceased) who became chairman of the board. It was only natural, therefore, that his thoughts should return to Espanola in the consideration of a location of a pulp mill.

Back in 1917, for a short period of time, he had lived at the Y.M.C.A. at the Soo with Ben Avery, then starting in the forestry department of the Spanish River Company. On many occasions Ben had mentioned the fact that the engineers and chemists should work out some way to utilize the jackpine on the property. When Espanola was under consideration for the building of a pulp mill, Mr. Hayward visited Fort William and discussed in detail with Mr. Avery the wood resources, particularly the jackpine, standing on the timber limits.

Mr. Avery had remained with the Spanish River Company and then the Abitibi Company until 1937 and was thoroughly familiar with the wood available on the limits. Mr. Avery continued his interest in the development of the company and assisted in the selection of the personnel that would form the executive staff. On the first of April he joined the company as vice president and general manager. Thus after nearly thirty years of separation, Mr. Hayward and Mr. Avery again worked together in Espanola.

In 1925 the mill began to make water shipments from Little Current. Three years later, in 1928, the Spanish River Company was consolidated with the Abitibi Power & Paper Company which operated the mill at Espanola until 1930. Business was then in the midst of world-wide depression. Other Abitibi plants with better wood resources and lower costs were able to take care of their sales, and the mill was shut down. A competent maintenance crew was maintained to keep the property in excellent condition.

Many of the families moved out of the town and, of course, the houses depreciated a great deal during this time. News that the mill was to be revived and made even larger brought a thrill to the people almost beyond belief. It seemed like nothing short of a miracle. A brief flurry of prosperity had occurred early in the war when the government had taken over the plant for a prison camp. Some 1200 prisoners from the German air force and submarine crews were housed in the old finishing room and warehouse. There was almost a like number of Canadian veterans to guard them. The incident will remain long in the memory of those who witnessed it with the attempted escapes and all the excitement of enemy aliens.

Personnel of KVP Limited

Solidly behind the operational program at Espanola is a group of competent men, each one chosen for his particular position. These officers and executives are:

Ralph A. Hayward, president

Ben F. Avery, vice president and general manager

E. Norval Hunter, secretary and manager of manufacturing

T. W. Peck, treasurer

W. J. White, technical director

S. J. Foster, chief engineer

R. E. Simkins, resident engineer

Thurston Iveson, kraft mill superintendent

Archie Hayes, paper mill superintendent

L. A. Bailey, purchasing agent

Harold Burke, woods manager

G. M. "Scotty" Stewart, logging superintendent

◆

▶▶▶ THE FOREST SERVICE has begun the advertising campaign for the sale of 1,500,000 cubic feet of Alaska timber, and one requirement is that the purchaser erect a pulp and paper mill to cost from twenty to thirty million dollars in the area continuous to the Tongass National Forest. The timber offered would produce 525 tons per day of newsprint for fifty years and consists of approximately 75 per cent western hemlock and 25 per cent spruce. This is the first offering of such timber and a number of other sales are reported to be contemplated to support additional mills.

CONTINENTAL PAPER CO. AGREES TO PAY LABOR A PER CENT OF BASE PAY

A unique labor contract has been entered into between the Continental Paper Company, of Bogota, New Jersey, and the United Paper Workers of America, No. 299, a C.I.O. organization.

This contract, declared to be the first of its kind in the United States, was officially signed August 21 at a luncheon held in the Waldorf-Astoria Hotel, New York City.

Under this agreement, known as the Rucker "Share of Production Pay Plan," the company guarantees to its employees 30½ per cent of its earnings above the cost of raw materials and supplies. The weekly base pay of the employees is charged to this percentage, and all earnings above the base pay within the 30½ per cent guaranty are placed to the credit of the employees monthly in cash payments, allotments for reserve and pension-fund deposits.

It was announced that the Continental company already has made the first payment under the contract. This amounted to an additional 20 per cent of the weekly earnings of the 400 employees for the last month. In amount, it averaged $56 for each employee above the average $280 base pay for the monthly period. Under the plan, however, the worker does not immediately receive the additional credit. Twenty-five per cent of this credit in each monthly period is placed in a reserve account which is balanced out twice a year. The remaining 75 per cent is divided, one-half into immediate cash payments to all employees and the other half for deposit in a pension fund to provide retirement income.

The plan was devised by A. W. Rucker, of the Eddy-Rucker-Nickels Company, management consultants of Cambridge, Massachusetts.

◆

FINANCIAL

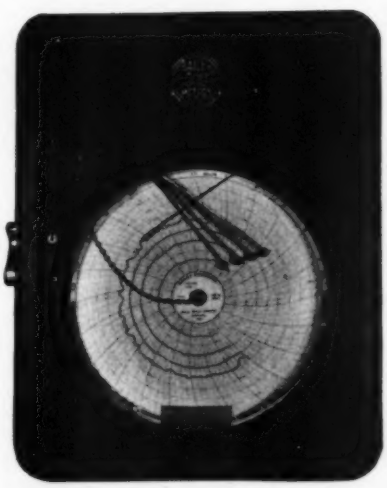
▶▶▶ THE SUMMER DULLNESS resulted in no notable changes in securities values during August.

American Writing Paper Corporation—Net earnings for the first six months of the year were $373,627 as against $122,059. The company plans to redeem all of the outstanding $505,550 in mortgage bonds by the end of the year.

Certain-teed Products Corporation—Net earnings for six months ended June 30 were $2,917,123 as against $1,712,321 a year ago.

Champion Paper & Fibre Company—Net earnings for the fiscal year ended April 27 totaled $5,375,645 as

Trick Arithmetic?



Bailey Electronic Recorder

NOT AT ALL. It's an equation instrument users are applying to simplify meter and control installations. It's an equation worth remembering.

Here's how it works:

The Bailey Meter Company has simplified electronic instruments and controls to 4 basic circuits and 8 basic component parts. With these 4 circuits and 8 parts you can get more than 100,000 combinations of electronic instruments and controls.

Here's what happens when you specify Bailey Controls. First of all, you can automatically reduce your stock of replacement parts. You don't need as many. Parts are interchangeable. You have fewer dollars idling in the stockroom.

Next, you save maintenance costs. Maintenance men quickly become familiar with the standardized Bailey Parts. Repairs take less time. Furthermore, training on a multiplicity of different assemblies is unnecessary.

Tube problems vanish, too, when Bailey Meters are installed. Tubes are the standard, easy-to-get type. Specials and order-from-the-factory variety have been avoided.

If you are crowded for panel space, then by all means get complete information about Bailey Meters and Controls. Write today for a copy of bulletin No. 17. Bailey Meters save panel space.

P-14

BAILEY METER COMPANY

1058 Ivanhoe Road Cleveland 10, Ohio

4 records, 1 chart

Four instruments occupy the space of one. This four-pen Pyrotron gives the same number of continuous records as four separate instruments. A separate system actuates each pen. Each record is in a distinctive color. Units are interchangeable. For complete information about this space-saving instrument ask for bulletin 230-A.

against $2,057,444 for the preceding year.

Eastern Corporation—Net profit for six months ended June 30 was $662,123 as against $340,253 a year ago.

Great Northern Paper Company—Net profit for six months ended June 30 were $2,080,639.50 as against $981,985.63 during the same period in 1946.

Hinde & Dauch Paper Company—Net earnings for six months ended June 30 were $1,816,100 as against $856,916 for the same period in 1946.

International Paper Company—Net profit for three months ended June 30 was $14,747,370 as against $7,235,905 for the same period in 1946. Net profit for six months ended June 30 $26,407,910 as against $11,477,417 a year ago.

Marathon Corporation — Consolidated net earnings for nine months ended July 31 were $3,599,300 as against $2,051,960 for the same period in 1946.

Minnesota & Ontario Paper Company—Net profit for six months ended June 30 was $2,635,775 as against $1,004,414 for the same period a year ago.

National Container Corporation—Net earnings for three months ended June 30 were $2,888,359 as against $1,032,522 a year ago.

Puget Sound Pulp & Timber Company—Net earnings for six months ended June 30 were $2,269,234 as against $347,838 a year ago.

Rayonier, Inc.—Net income for the six months ended June 30 was $3,845,080 as against $1,022,676 for the same period a year ago.

San-Nap-Pak Manufacturing Company—Net earnings for six months ended June 30 were $718,782 as against $288,387 a year ago.

Sorg Paper Company—Net income for six months ended June 30 was $743,922 as against $167,105 for the same period in 1946.

Union Bag & Paper Corporation—Net earnings for six months ended June 30 were $5,743,542 as against $2,347,935 a year ago.

United States Envelope Company—Net earnings for six months ended June 30 were $833,200 as against $330,302 a year ago.

Paper Mill Corporate Changes

Brunswick Pulp & Paper Company—J. P. Morgan Company, and a group of associated banks have arranged an issue of $4,500,000 in 2⅛ per cent installment notes to prepay all of the company's outstanding bonds. The company is jointly owned by Scott Paper Company and Mead Corporation.

Monroe Falls Paper Company—The entire stock of the Monroe Falls Paper Company, Monroe Falls, Ohio, has been purchased by the Hankins Container Company of Cleveland.

New York Stock Exchange—Stocks

	Closing Prices Aug. 25	July 25
A.P.W. Products	4	4¼
Celotex	27⅛	28
Same Preferred	*20¼-29⅜	20⅜
Certain-teed Products	16¾	17¼
Champion P & F Co.	24	25¼
Same Preferred	109½	106½
Container Corp.	40¼	45
Same Preferred	103½	....
Cont. Diamond	10⅜	10⅞
Crown Zellerbach	31½	31⅞
Same Preferred	105¼	106
Same $4 Preferred	118½	120
Dixie Vortex	38	36
Same "A"	53	*52½-53
Robert Gair Co.	8¾	9
Same Preferred	19¾	*19¾-20⅛
Gaylord Container	19½	19⅛
Same Preferred	*110-120	115
International Paper	46¾	49⅞
Same Preferred	*107-109	*105⅞-106¾
Kimberly-Clark	24¾	25½
Same Preferred	*109⅜-110¼	109¾
McAndrews & Forbes	37⅝	39
Marathon	24	25½
Masonite	*53½-54⅜	55¼
Mead Corp.	20¾	22¼
Same Preferred	96½	*99-100½
Same 2nd Preferred	*45-47½	48
National Container (New)	14	....
Paraffine Cos.	67	*68-70½
Same Preferred	107	*107-110½
Rayonier, Inc.	26½	25½
Same Preferred	37¼	37
Scott Paper	*46-47	45
Same Preferred	103⅜	100⅜
St. Regis	10⅛	11¼
Sutherland Paper	*41¾-42½	42
Union Bag & Paper	34⅝	34¼
United Paperboard	14¼	16
U. S. Gypsum	100¾	103½
Same Preferred	*187½-190	*187½-190
U. S. Wall Paper	8⅛	9
Same Preferred	*44½-46½	*45½-47½
West Va. P & P Co.	40	42
Same Preferred	*110-111	111

New York Stock Exchange—Bonds

Celotex 3½%	....	....
Champion P & F Co.	....	....

New York Curb Exchange—Stocks

Am. Writing	9	9
Great Northern	44⅝	46
Taggart	9⅞	....

*Closing Bid and Asked Prices.

◆

FALL COURSES IN PAPER, PULP, AND PRINTING INK ANNOUNCED BY N. Y. U.

Three courses in the paper and printing inks field will be offered during the fall term, beginning September 24, by the Division of General Education, New York University's school for adults. Printing Inks and Printing Processes and the Survey of Pulp and Paper given last year will be supplemented by a new lecture series in the Manufacture and Conversion of Paper Board. All three courses will meet in evening sessions at the Barbizon Plaza Hotel, Fifty-eighth Street and Sixth Avenue, New York City.

Harold M. Annis, staff production manager, Oxford Paper Company, will again conduct the Survey of Pulp and Paper. This course consists of fifteen lectures given by leading figures in the pulp and paper industry and presided over by Mr. Annis. It will meet Wednesday evenings from 6:15 to 8:00 p.m. beginning September 24.

Attended by more than five hundred people last year, the Survey of Pulp and Paper has been revised to include one lecture on paper grade classification by Ronald Atwater of the Mead Sales Company, and another on Paper Marketing by John Crosson, of McGraw-Hill Book Company.

Other topics will include discussions of sulphite, groundwood and alkaline pulps; paper sizing, loading and coloring; testing and servicing of printing papers; paper for offset lithography; groundwood printing papers; and others to provide an over-all view of the industry.

Among the lecturers will be Vance P. Edwardes, International Paper Company; Chester G. Landes, American Cyanamid Company; Philip Goldsmith, Pusey and Jones Corporation; Wade Griswold, executive director, Lithographic Technical Foundation; and Byron Wehmhoff, West Virginia Pulp and Paper Company.

Henry J. Howlett, secretary of the American Management Association, will be moderator for the new course in the Manufacture and Conversion of Paper Board. The course, also given in a fifteen lecture series by experts for the paperboard industry, will meet on Tuesday evenings, beginning September 30, from 6:15 to 8:00 p.m.

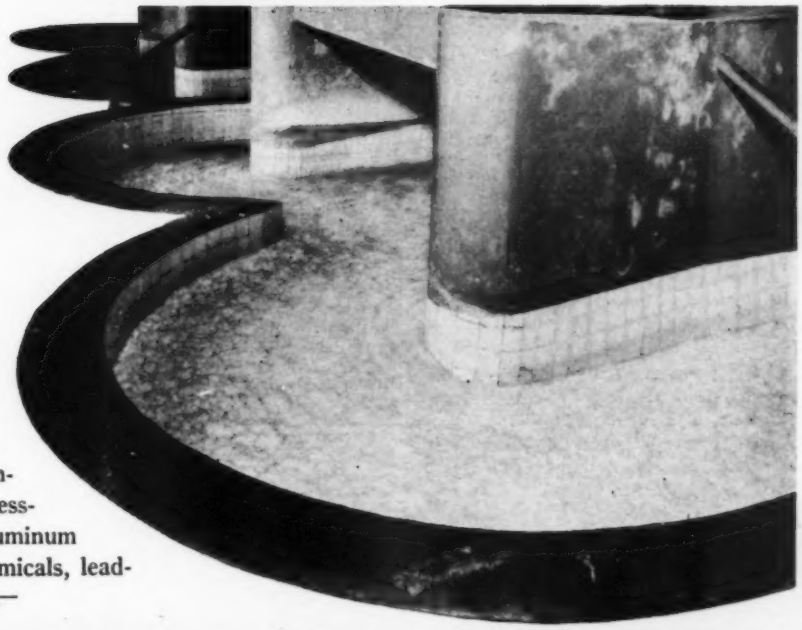
The lectures will range from raw materials problems through all phases of manufacture of various kinds of boxes to final lectures about paperboard specialties and Rule 41-Official Freight Classification. Speakers will include Pierre Loddengaard, United Paper Board Company; J. D. Malcolmson, Robert Gair Company; H. M. Kieckhefer, Kieckhefer Container Company; W. F. Devenau, National Folding Box Company; and Harry Schwartz, Robertson Paper Box Company.

The fifteen lectures in Printing Inks and Printing Processes will be conducted by Dr. William Hodgkiss, of the Sun Chemical Corporation. The course will meet on Tuesday evenings from 6:15 to 8:00 p.m. beginning September 30.

All aspects of the printing inks field will be covered. Topics will include: printing papers; color; drying oils; synthetic resins; news, lithographic and rotogravure inks; testing of raw material and finished product. Among the speakers will be Dr. Gerard Larocque, *New York Daily News;* Dr. J. J. Mattielo, Hilo Varnish Company; and Irving Simon, Macfadden Publications.

For full information about registra-

sizing



Maximum sizing and pH control call for careful selection of the chemicals used in paper making. Their quality must be uniform, their purity consistent, in order to insure perfect sizing. To take the guesswork out of their selection of Aluminum Sulfate and other paper-making chemicals, leading producers throughout the nation—

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- Sodium Sulfide
- Sodium Hyposulfite
- Sodium Sulfite, *Anhydrous*
- Sodium Bisulfite, *Anhydrous*
- Disodium Phosphate
- Trisodium Phosphate
- Tetrasodium Pyrophosphate
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- Nitric Acid
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- Aqua Ammonia

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◆

NEPCO MILL OFFICE AT PORT EDWARDS HAS BEEN ENLARGED AND MODERNIZED

The Nekoosa-Edwards Paper Company's mill office at Port Edwards, Wisconsin, has been enlarged and remodeled throughout to relieve overcrowded conditions in the various departments located in the building. A 43 by 20 foot two-story wing has been added to the building adjoining the northeast corner of the structure, and the entire front of the building has been remodeled so as to be in harmony with the architectural design of the new addition.

Departments housed in the newly enlarged office are manufacturing, personnel administration, technical, timekeeper, health and safety, engineering, light and power, research, and the central telephone office, with increased office and work space available to the first four named. Additional laboratory facilities have also been provided for, and the new laboratory section is completed and ready for the research and development work which will be carried on there.

◆

CONTINENTAL CAN SELECTS TONAWANDA SITE FOR ITS NEW FIBER DRUM PLANT

Erection of a $2,000,000 plant on a 40-acre tract in Tonawanda, New York, has been announced by J. F. Price, general manager of the Continental Can Company's paper division.

The company had been examining sites in the Buffalo area since last fall. The plant, which will manufacture fiber drums and containers, is to be completed next June. The new plant will employ 400 workers at the outset.

◆

INTERNATIONAL PAPER CO. ANNOUNCES A TWO-YEAR MODERNIZATION PROGRAM

Plans for a two-year modernization program to be completed at an estimated cost of $1,450,000 at the International Paper Company mill in North Tonawanda, New York, have been announced by J. W. Youngchild, plant manager.

By the end of 1947, $700,000 will have been spent and an additional $750,000 will be expended in 1948. Among the improvements planned are a new stage for bleaching paper pulp and new washing equipment in the pulp mill section, new winders for finished paper and a modern paper finishing room. Recovery operations equipment will include a cascade evaporator and electric precipitating equipment designed to eliminate ash from smoke.

New Mill office at Port Edwards (Wis.) plant of Nekoosa-Edwards Paper Co.

◆

THOMAS WILSON IS MADE AN OFFICER OF THE FOREST PRODUCTS RESEARCH SOCIETY

Former chief of the U. S. Forest Products Laboratory division of timber mechanics, Thomas R. C. Wilson, has been appointed secretary-treasurer of the Forest Products Research Society. Mr. Wilson, who is now in charge of the Society's permanent office in Madison, Wisconsin, succeeds William J. Baker who has joined the staff of the Oregon Forest Products Laboratory at Corvallis, Oregon.

Thomas R. C. Wilson

Mr. Baker, a U. S. Forest Products Laboratory technologist, is one of the original founders of the Society, serving as secretary of the organizational committee and then being appointed the first secretary-treasurer. He will continue to be active as a member of the Society's Pacific Northwest section.

Along with this announcement, Fred W. Gottschalk, president of the Society, said that the executive board had voted to accept memberships from residences of foreign countries "except those belligerent to the United States." Previously, membership was limited to residents of the United States and its possessions and Canada. Mr. Gottschalk also pointed out that the Society has grown to a charter membership of 600 in the first eight months of its existence. The charter membership period will close September 30, he said.

The first national meeting of the Forest Products Research Society will be held at the Furniture Club of America, Furniture Mart, Chicago, October 31 and November 1. The program includes a wide variety of papers for three separate panel sessions: (1) Chemical Utilization of Wood, (2) Engineering Aspects of Wood Use, and (3) Seasoning and Preservation.

◆

UNION BAG & PAPER CORP. AWARDS SCHOLARSHIPS IN FORESTRY FOR 1947-48

The Union Bag & Paper Corporation forestry scholarships at the George Peabody School of Forestry, University of Georgia, Athens, for the 1947-48 term have been awarded to Frank Miles of Baxley, Ga., and M. L. Miller, Jr., of Stilson, Ga.

Donald J. Weddell, dean of the School of Forestry, stated that both of the youths did outstanding work on forestry projects through the 4-H

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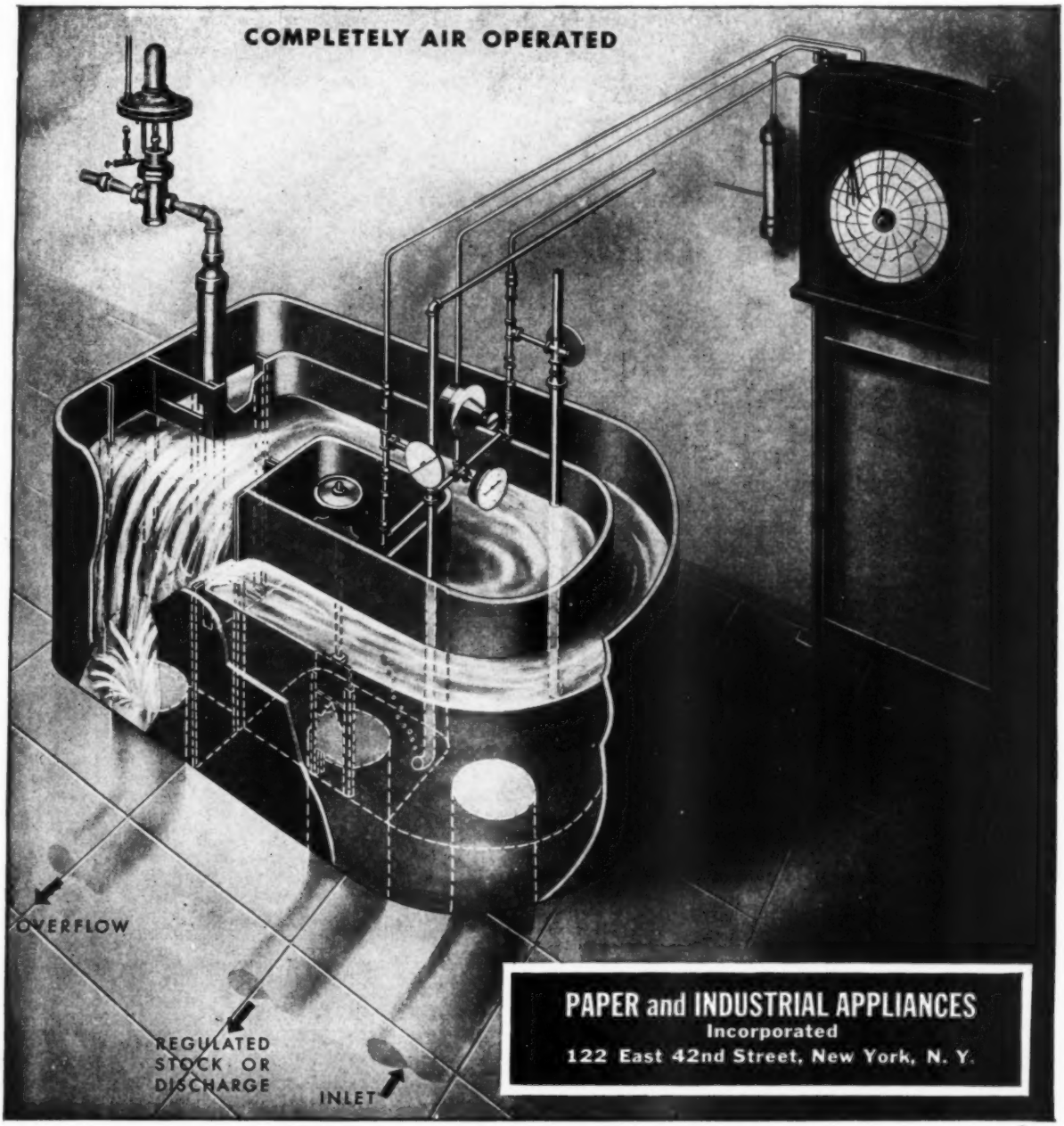


Club and the Future Farmers of America group for the past several years, and had splendid records as students in their respective high schools. They will enroll at the Forestry School at Athens in September.

The two Union Bag & Paper scholarships are for four years, and each recipient receives $400 during each school year of the four-year forestry course. The scholarships are awarded on the basis of high school achievements, pre-forestry training, interest in private forestry, and personality.

◆

SULPHATE PLANT PLANNED BY WEYERHAEUSER PULP DIV. FOR SPRINGFIELD (ORE.)

Announcement was made August 8 by J. P. Weyerhaeuser, Jr., president of the Weyerhaeuser Timber Company, that a sulphate plant will be constructed at Springfield, Oregon. The entire output of unbleached pulp will be used in container board manufacture. Under construction at present, on the same site, and previously announced, is a complete lumber plant with kiln drying and planing facilities. The sulphate mill unit is another step in the company's long range planned program of integrated wood utilization being worked out at its various manufacturing plants.

"In planning our installation at Springfield, we gave thorough consideration to several processes and products that would use the waste that develops incidental to lumbering and sawmill operations. The unbleached sulphate container board mill offered the most suitable means of integrated wood utilization. It will operate entirely on wood not suited for lumber manufacture. The plant's capacity also will provide for the utilization of wood waste from other local logging and milling operations," Mr. Weyerhaeuser stated in outlining the scope of the plant's activities.

Operation of the plant and sale of the product will be handled by Weyerhaeuser's Pulp Division. Manufacturing facilities of this division at present consist of bleached sulphite mills at Longview and Everett, Washington, which have been in operation since 1931 and 1936, respectively. A new bleached sulphate pulp mill is now under construction at Longview.

According to Howard Morgan, manager of the Pulp Division of the Weyerhaeuser Timber Company, the plant will produce approximately 150 tons a day of container board of the type used to manufacture fiber shipping containers. Containers will not be manufactured at the Springfield plant. The product will be distributed to West Coast users who manufacture containers from the board. The plant will be a one machine plant employing approximately 175 people, and will have no facilities for pulp bleaching or for the production of market pulp. Specially designed equipment is being worked out for the cleaning and handling of mill waste as well as for the production of chips. The mill also will have a wood room equipped with hydraulic barking and multiknife chippers for handling small logs resulting from the prelogging operations.

All logging operations are under the direction of Jon Titcomb, manager of the sawmill plant at Springfield. According to Mr. Titcomb, both prelogging and relogging will be used. From the viewpoint of sustained yield forest management, the sulphate board plant will provide a commercial outlet for utilizing all wood not suited to lumber manufacture. It will provide an economic incentive for practicing good forestry in the woods in a way that will enhance the operation's future timber supply.

◆

TWO DIVISIONS COMBINED BY BUREAU OF STANDARDS

The National Bureau of Standards, Washington, D. C., has announced that two of its divisions, the Commercial Standards and Simplified Practice, have been consolidated into a single division called Commodity Standards.

The new Commodity Standards Division will continue the Bureau's coordinating role in the development of voluntary simplified practice recommendations and commercial standards with industrial and technical groups. Edwin W. Ely, former chief of the Simplified Practice Divisions, has been appointed as chief of the division, and F. W. Reynolds, former acting chief of Commercial Standards, has been made assistant chief.

◆

ST. REGIS TO BUILD PAPER AND BAG PLANT AT TACOMA

An earlier report that St. Regis Paper Company will build a kraft paper mill and bag plant at Tacoma, Washington, was confirmed by Roy K. Ferguson, company president, following a meeting of the board of directors on August 20.

Present plans call for construction of a $6,000,000 kraft paper mill and multiwall bag plant in connection with the company's sulphate pulp mill at Tacoma. One of the new buildings will house a paper machine to produce paper 168 inches wide, and having a speed of 2,000 fpm. This will produce 240 tons of paper every 24 hours.

The cost of the paper mill buildings and equipment will run approximately $4,000,000, while the estimated cost of buildings for the bag plant, is $2,000,000. The cost of machinery for the bag plant will be additional. The bag plant will be a primary unit; it is expected that future additions will be made. The first bag plant will be designed to convert about 50,000 tons of kraft paper a year into multiwall bags.

◆

STUDY OF WATERPROOFED PAPER UNDERTAKEN BY BUREAU OF STANDARDS

A long-range research program investigating waterproofed papers is being organized at the National Bureau of Standards through a fellowship of the Waterproof Paper Manufacturers Association. The Association is providing the services of Robert C. Reichel, former research associate at the Bureau for the Insulation Board Institute, as research associate. Laboratory facilities and technical assistance will be furnished by the Bureau.

The papers to be studied comprise a wide variety of high-strength papers used for such purposes as packaging, curing of concrete, and moisture barriers in buildings. The project for immediate investigation at the Bureau is the development of a suitable accelerated aging test for predicting permanence of the papers.

◆

MASONITE TO INCREASE ACCOMMODATIONS AT ITS LAUREL, MISS., CLINIC

Contract has been let by the Masonite Corporation for the construction of a 22-bed hospital addition to Masonite Clinic building at Laurel (Miss.). The new building, with equipment and furnishings, will be completed in about seven months at a cost of more than $150,000.

The improvement will enable Masonite to extend and improve the medical and surgical service it has provided without cost for the last fifteen years primarily for employees and their dependents.

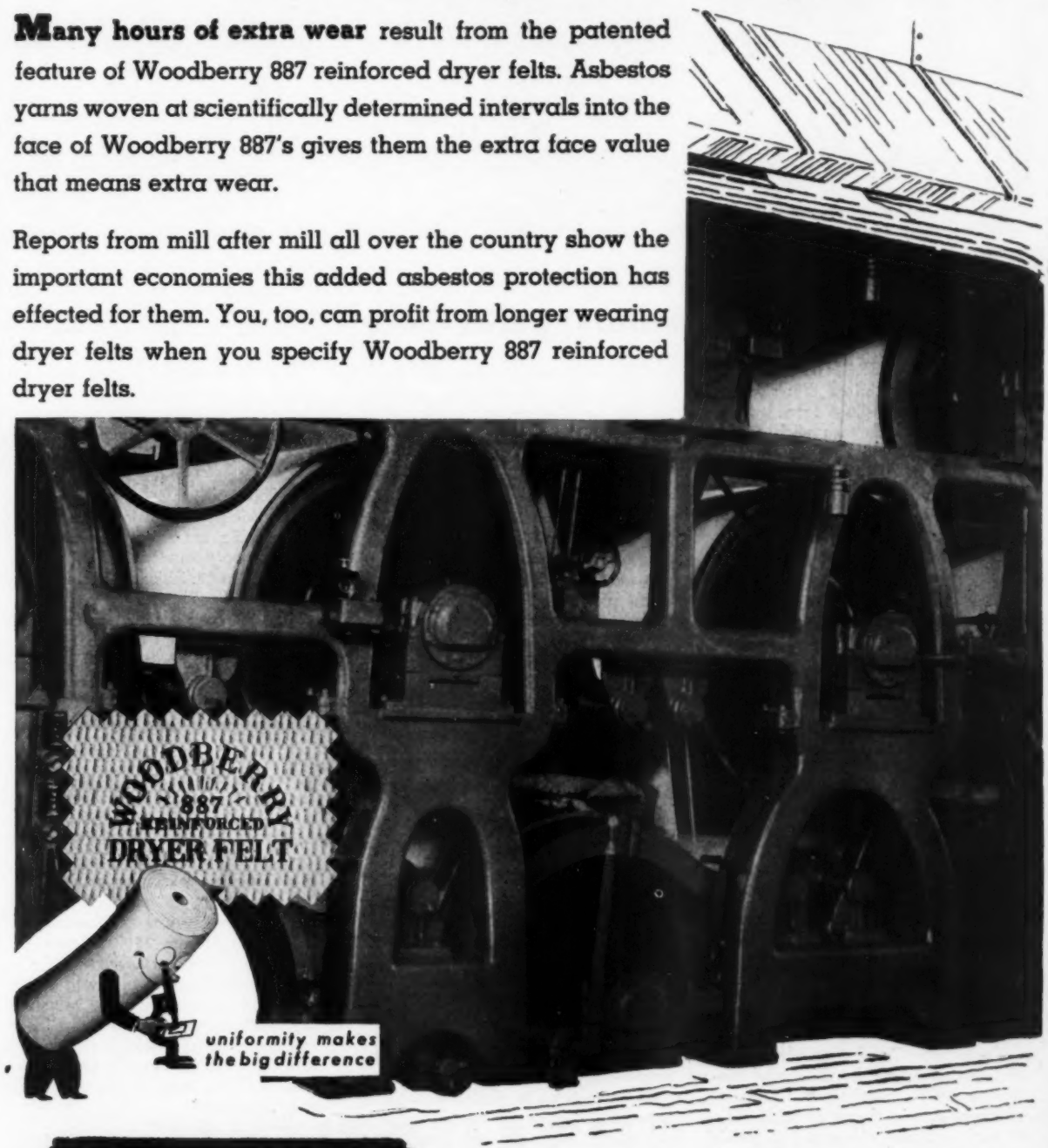
The 14-room fireproof building will add a floor space of 9,200 square feet to the clinic's present 5,800 square feet. Space released in the clinic will be used principally for a delivery room and four additional treatment rooms.

The present clinic was erected and equipped six years ago at a cost of $60,000. However, facilities became overtaxed because of the increase in Masonite employment to over 2,500 persons. The director of the clinic is Dr. G. E. Holder.

The Dollars and Sense of Choosing Woodberry 887 Dryer Felts

Many hours of extra wear result from the patented feature of Woodberry 887 reinforced dryer felts. Asbestos yarns woven at scientifically determined intervals into the face of Woodberry 887's gives them the extra face value that means extra wear.

Reports from mill after mill all over the country show the important economies this added asbestos protection has effected for them. You, too, can profit from longer wearing dryer felts when you specify Woodberry 887 reinforced dryer felts.



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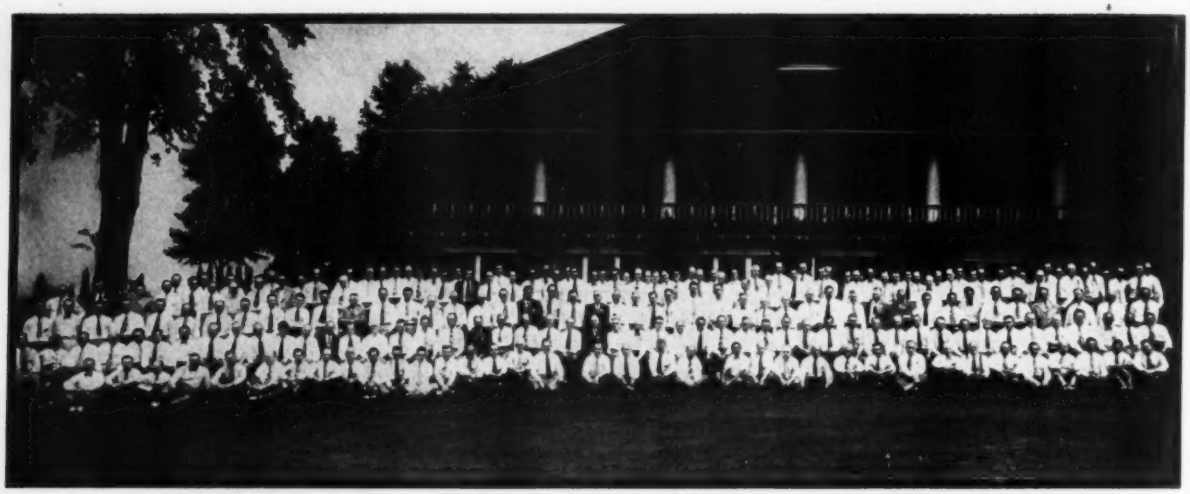


Hammermill Agents Gather for 34th Annual Conference

▶▶▶ PAPER MERCHANTS from all parts of the United States, from Canada, and from Cuba attended the thirty-fourth conference with Hammermill agents, held at Erie, Pennsylvania, August 20, 21 and 22. The attendance numbered 186, just four short of the 1946 conference which broke a record for attendance.

In his welcome to the agents at the first business session of the conference, Norman W. Wilson, president of Hammermill Paper Company, stressed the spirit of friendship and business co-operation that exists between the company and its agents. At the same session, Donald S. Leslie, Hammermill's first vice president and general manager, spoke on certain phases of the mill's expansion program that have been completed and those that are still in process. In the latter group is the No. 7 papermaking machine, now being installed; this is the largest fourdrinier machine to be installed by Hammermill.

Perhaps the principal topic of interest to the agents which was highlighted throughout the sessions was the company's Cockletone Bond, the first new line of paper to come out following the company's postwar expansion program. At the August 21 meeting a Cockletone Bond "roundup" was held. Participating in this panel discussion were: Harrison R. Baldwin, vice president in charge of sales; John D. Zink, assistant vice president; Walter G. Hendrick, laboratory research expert; Grant Richardson, eastern district salesmanager, and A. Ellis Frampton, advertising manager and assistant general sales manager.

Bruce Barton, well known author and executive of the firm, Batten, Barton, Durstine and Osborne, Hammermill's advertising counselors, spoke at the August 22 meeting. Although he followed his particular humorous and informal style, his talk included a discussion of the foreign affairs policy of the United States. "It is," Mr. Barton, stated, "very wholesome that the American people are now beginning to think about foreign policy and to discuss it. The only hope of the world is to keep our economic system strong and to believe in it."

Other speakers at the meeting on the 22nd were N. W. Wilson, D. S. Leslie, H. R. Baldwin, and A. E. Frampton. Mr. Baldwin discussed the present production of various Hammermill lines, while Mr. Frampton spoke about the function of Hammermill advertising and its relation to the sale of Hammermill papers.

The conference agenda included recreational features, the final afternoon being given over to golf and other games.

◆

ROTOGRAVURE FROM CANADA DUTIABLE AS COATED PAPER

Paper from Canada claimed to be dutiable at one-fifth of 1 cent per pound and 5 per cent as printing paper and described as clay loaded rotogravure paper, has been held by Customs officials to be dutiable as coated paper at 5 cents per pound and 15 per cent. A classic definition by an American manufacturer that "coated paper is a paper with a coating on it" has been sustained by administrative officials, according to Warren B. Bullock, manager of the Import Committee of the American Paper Industry.

Paper imported at San Francisco claimed by the importer to be dutiable as wrapping paper at 25 per cent, has been classified for duty as vegetable parchment at 2 cents per pound and 10 per cent.

English photographic paper has been found by Customs officials to have been undervalued on entry. Importers were required to amend their entries to bring the dutiable value up to the proper market value and duty was collected on the higher value. While this procedure involves technical dumping, the present American administration policy is to avoid imposition of an additional antidumping duty.

Finnish paper claimed to be printing paper is believed to be sulphite bond has been submitted to the industry for opinions as to its proper classification.

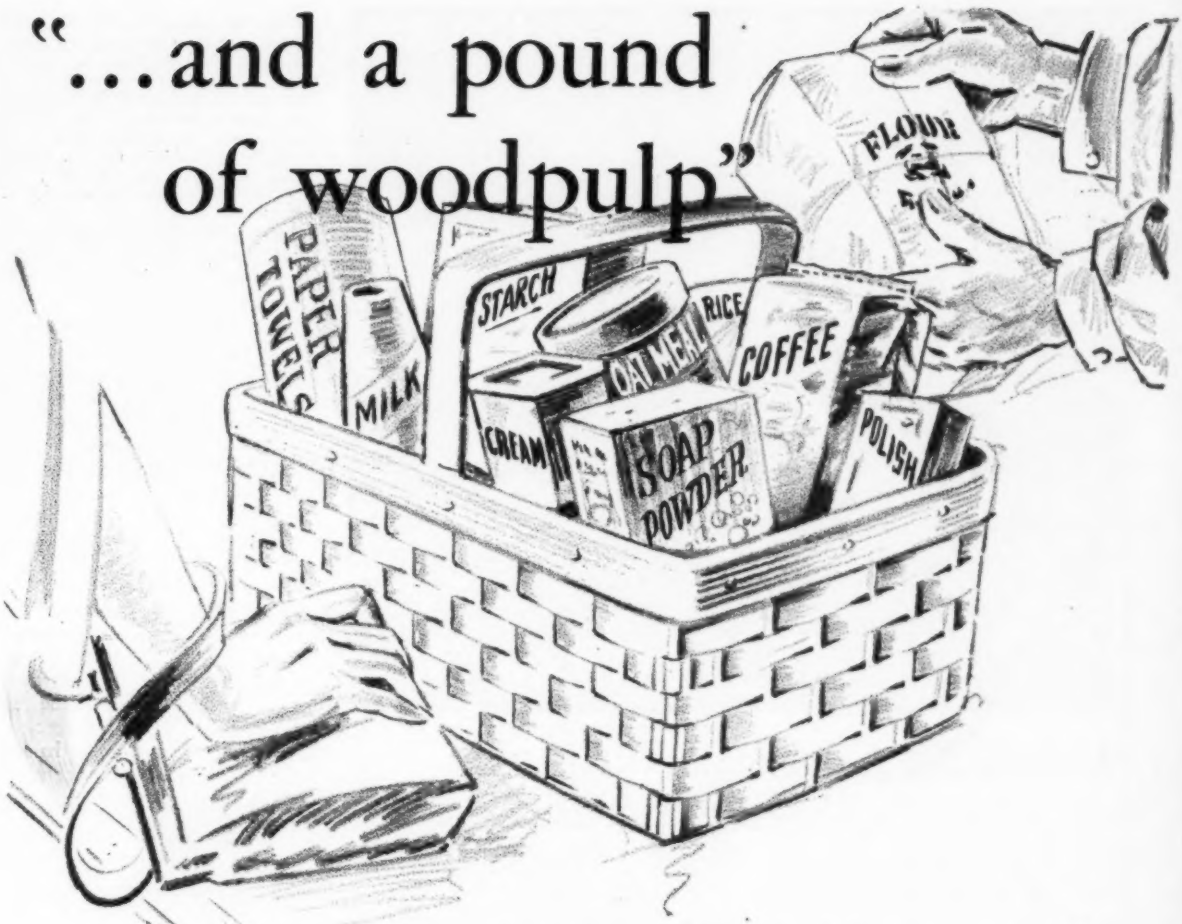
◆

▶▶▶ A FORMAL INTERIM report has been issued by the House of Representatives special committee on Newsprint and Paper Supply which announces it will continue its efforts to secure additional newsprint supply. The Committee claims credit for bringing about an expansion of 450,000 tons of annual production and that an additional 200,000 tons will reach American markets late this year or early 1948. This increased output will include the prospective new mills in Alabama and Alaska, but in its forecast that this additional tonnage will be available as early as this year it would seem that the forecast is unduly optimistic.

◆

▶▶▶ A BRANCH SALES OFFICE in Los Angeles has been opened by the International Paper Products Division of the International Paper Company, New York. Frank N. Gladden is the district sales manager with offices at 607 South Hill Street, Los Angeles.

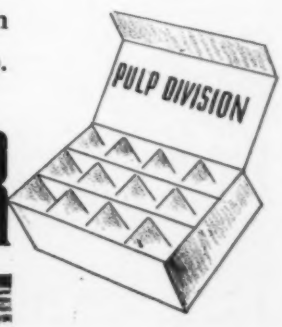
"...and a pound of woodpulp"



Not as absurd a remark as you may think, for it is Mrs. Housewife who ultimately buys and uses most of America's paper and paperboard.

Consider the multiplicity of items which are sold in today's markets—items which are either made of paper or packaged in a product made of woodpulp, molded or fabricated in one of a thousand ways to serve your interests . . . satisfy your needs.

As part of an industry which provides other industries with truly essential services, it is the job of the Pulp Division, Weyerhaeuser Timber Company, to furnish an assured and continuing supply of chemical woodpulp.



WEYERHAEUSER

Radio in a new role. This illustration appeared on the cover of the July-August issue of "The Mandonian." Winfred Leydier, assistant electrical superintendent of the Kenora mill of Minnesota and Ontario Paper Co., tests 60 watt FM trunk unit transmitter-receiver in the field in preparation for use on the summer logging drive. (Photo by Lawler)

Mando Moves Ahead . . . a New Era Replaces the Old

Two-way Radio Directs Log Drive

▶▶▶ THE SCIENTIFIC advancement of communications and transportation has brought to all industry facilities with which to meet the demands of modern times.

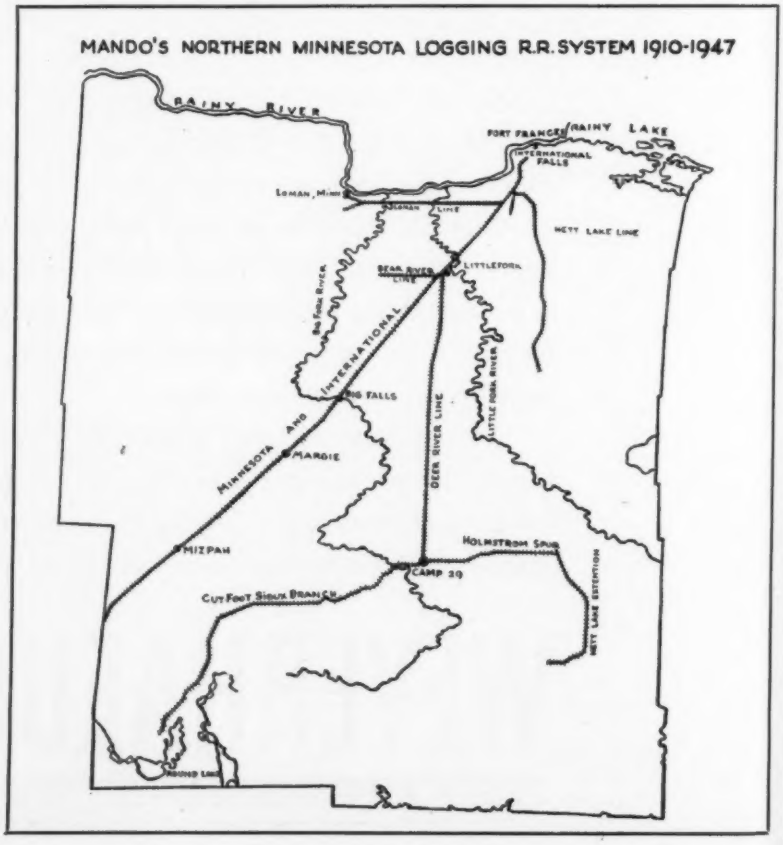
This summer, the Minnesota and Ontario Paper Company (Minneapolis) introduced the use of two-way radio to expedite a major log drive near the Minnesota border in Ontario. This is the first time in the history of logging that FM has been used to establish communication among widely disbursed logging units engaged in the summer movement of thousands of cords of pulpwood for paper and insulation board, according to Mr. Andrews and the General Electric Company, manufacturers of the electronic equipment.

"Thousands of cords of pulpwood must be rounded up from many lakes and herded through a labyrinth of rivers, lakes and dams to arrive eventually at mills. The harvest of pulpwood begins with the spring thaw and ends with the winter freeze up. It is a battle against time which radio is helping immeasurably," Mr. Andrews said.

Basis of the novel use of radio is a recently-installed FM network link between the company's mills at Fort Frances, on the International Border, and Kenora, in the Ontario province of Canada, 93 air-miles to the north. Transmitters and 300-ft. steel antennas are located at each site.

To completely cover the area, two relay stations were established about 60 miles from each station. The four key stations make it possible for nine radio-equipped logging camps scattered throughout the surrounding area to send and receive messages, either by direct communication or by relay, to other stations in the network.

The portable stations for the log drive by radio are a 60-watt G-E, FM transmitter and receiver, shock mounted in a small, taxi-size wardrobe trunk. When the trunk lid is open a control panel is exposed which contains a loud speaker, the necessary controls, and a wall bracket to mount and hold the telephone handset. In the upper right hand corner of the trunk is located an antenna mounting bracket.



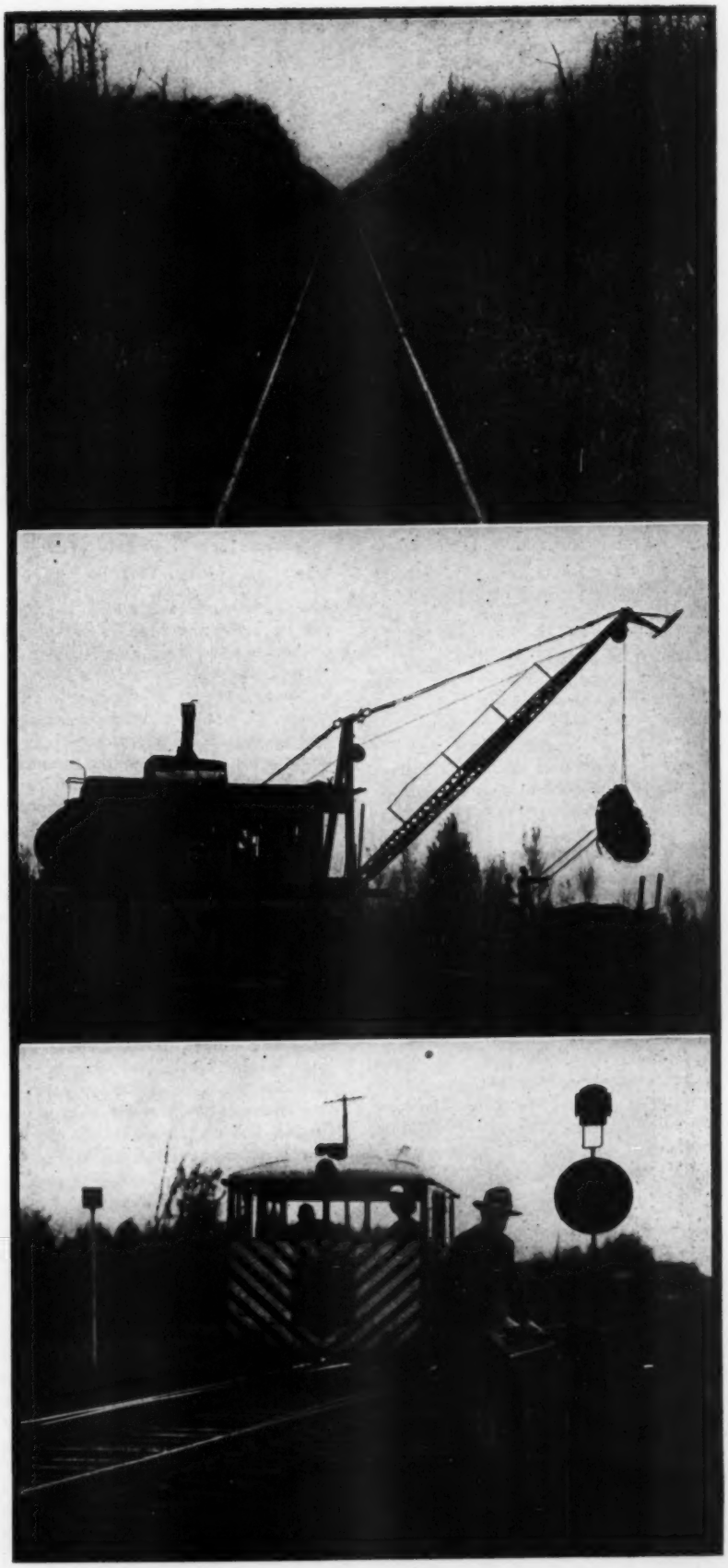
The complete station can be assembled and put on the air in less than five minues, according to Mando's electronics engineer.

"One of the factors which has given modern armies a tremendously increased striking power is the close coordination between its multi-functional units made possible through rapid, efficient and dependable radio communications. And so it is with logging," stated Mr. Andrews. "Personnel must be transferred from camp to camp where unforeseen circumstances call for men in a hurry . . . Machines break down and repair parts must be rushed to the camp . . . Accidents happen when immediate attention or advice is necessary . . . Weather forecasts from the outside world are necessary for efficient operations . . . Forest fires which spring up in remote sections are a constant danger."

Deer River Logging Line Will Soon Become History

In line with its program of advancement, the lifting of Mando's Deer River railway line this summer foretells the end of an era in logging. This is the last section of a logging railroad originally constructed to tap the forest resources of northern Minnesota and to transport them to the large pulp, paper, and saw mill operations of the company at International Falls. The 32-mile single track from Littlefork into the heart of some of Minnesota's finest pulpwood stands in the Craigville area, is now being removed. This spells a victory for gasoline over coal, of relatively light trucking equipment that can penetrate the woods and frozen swamps on temporary roads over the more unwieldy locomotives, flatcars, hoists and jammers that require graded right-of-ways and roadbeds needing costly maintenance. Motorized vehicles, carrying up to 16 cords of pulpwood, now load where the wood is cut and deliver it to the door of the mill, without extra handling.

The Deer River line was constructed during the period of 1912-1914. It was little used during the period from 1938-1941, but came back into its own with the outbreak of the war when during that emergency, vitally



Reading from the top: (1) End of Wye at Camp 29. Abandoned right-of-way in distance. (2) Cody hoist loads pulpwood onto flatcar at Camp 29 landing. Scenes such as this soon will be a thing of the past in this area. (3) Inspection trip. Warner LaDu, M.D. & W. superintendent, throws a switch at junction of Deer River line with the N.P. at Littlefork.

needed pulpwood was transported by rail due to shortages of gasoline, tires, and mechanical equipment.

When it was learned that the Deer River Division would be torn up, old-timers began to figure the number of cords or carloads of timber that had been transported over the line to International Falls.

Frank L. Bussmann, superintendent of forest production, looked up the records as far back as 1914 and came up with what he believes is a fairly accurate answer. If all the sawlogs, pulpwood, poles and ties that have been hauled on this line were converted to cords, the total would be approximately 2,000,000 cords, or an average of 60,000 cords annually for 33 years. Two million cords of wood is easier to comprehend when you are told that it would fill 135,000 standard railway flatcars. Carrying that load at an average rate of 5,000 cars per year is what the Deer River line has contributed to the economy of the North Country and the progress of Mando.

The story of the old road during its years of service is full of human interest: anecdotes, tales of valor and courage, accidents, both fatal and costly. Some of the characters involved have become legends, for the men who built and operated the lines faced all the hardships and perils of frontier railroading.

New Amphibian Will Aid in Woods Operation

Another progressive step in Mando's operations is the company's new Republic "Seabee," amphibian. The new plane based at Fort Frances is expected to have many uses in logging, forest management, emergency transportation and personnel ferrying.

Primary use of the plan will be for logging supervision in the area where presently some 50,000 cords of pulpwood are being driven 140 miles down the Little Turtle River. In a comparatively short time, progress can be observed at many different points, many of which formerly could be reached only by walking.

The plane will be invaluable for selecting new camp sites from the air; forest management officials will use it for fire observation and for studying insect damaged forest areas. Aerial photographs also may be taken and studied in connection with mapping, estimation of timber growth, identification of wood species and other factors of sound forest management.

The use of a plane for logging operations is another step in the modernization program now being carried out in Mando's organization.

BRITISH PAPER NOTES (July, 1947)

▶▶▶ Although the storm over the cut in newsprint supplies to the national daily and weekly newspapers has abated, it still smoulders. The unfortunate feature of the whole affair is the fact that newsprint has been singled out of all the many kinds of imports for a cut when the monetary saving compared with the anticipated deficit between imports and exports, variously set at 700 to 400 million pounds is so small. This coupled with the present investigation of the press, which is being held in camera, tends to confirm the impression that the government is alleged to be set upon the road to suppressing the liberty of the press. While no direct charge is made in this direction, London papers have not hesitated to reproduce reports which have appeared along these lines in the New York papers. At least one widely read Sunday paper in its editorial has warned the nation that its last chance of saving the liberty of the press has arrived.

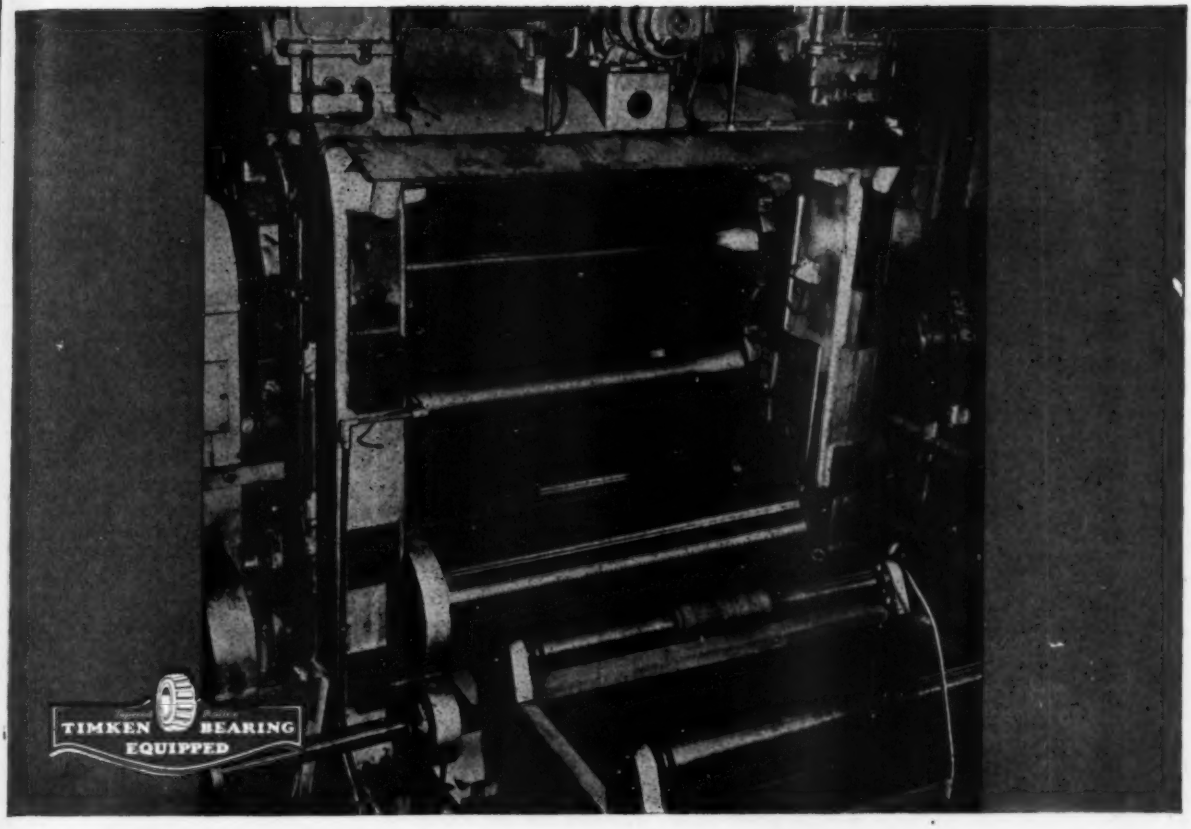
What is perhaps more important than all these speculations is the statement by the Newsprint Supply Company, Ltd., which has so ably and fairly controlled the distribution of newsprint since 1940, that while this company has complied with the government's wishes for a cut in newsprint it makes a strong protest and points out that the actual saving will be only one million pounds in six months. The 1947 supply of newsprint was to have been 405,000 tons against a prewar consumption of 1,200,000 tons and this present reduction to one-third of prewar is a greater reduction than that imposed on any other section of paper consumers. It is pointed out that the four-page basis for newspapers will be totally inadequate to report the heavy pressure of world news, most of which is of first-class importance, and with the present increasing cost of newsprint and other items of newspaper production the cut will lead to widespread unemployment among newspaper workers. Attention also has been drawn to the fact that upon government assurances contracts were placed with the North American mills for delivery of approximately 150,000 tons of newsprint in 1947, 180,000 tons in 1948, and nearly 300,000 tons in the succeeding three years. The government for the second time this year has called upon the Newsprint Supply Company to ask the North American suppliers to postpone delivery and has made it clear that such a postponement "would not imply any renewed commitment to take delivery of these or any further quantities later but that the whole matter would be left over for further examination by the beginning of next year when the position has been clarified."

It is feared that the postponement may lead to the loss of the contracts and thereby future supplies.

Just prior to the newsprint trouble a very substantial revision in the prices of practically all classes of papers and board came into operation. This in its turn will seriously affect publication of weekly and other journals although there price advances were to be expected with the continual increase in cost of all papermaking materials. Mechanical printing papers are advanced by £8 per ton for the best grades and are now listed at £51 per ton. Wood papers rose from £52-7-6 to £63-10-0, wood writings are up by £11-2-6 and now stand at £64-12-6 and wood cartridges have reached £69-2-6 ton. The esparto qualities are upgraded by about £11 per ton and top prices are £76-7-6. Massey coated papers, best grades esparto body, are £85-12-6 ton.

Unhappily along with price increases comes first intimation from the export market that purchasers are becoming restless at the uncertainty of prices and time for delivery and as a result the sellers market is gradually disappearing.

Despite the general expectancy of a national crisis in the autumn as the American loan runs out it is seen that the purchases of papermaking raw materials for the first half of this year are considerably higher than for the same period of last year. Actually they have reached 491,977 tons against 419,821 tons but this increase is entirely due to greater receipts of esparto grass. Imports of chemical, bleached

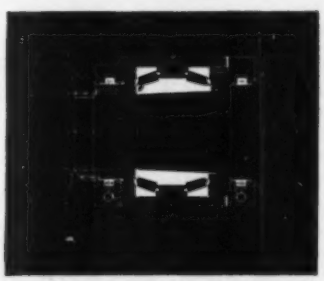


Canadian Resins And Chemicals Ltd. Demonstrates TIMKEN BEARING Precision on Plastics Calenders

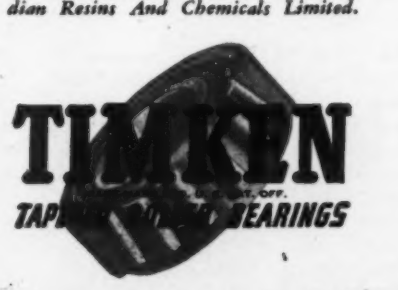
Rolling "Vinylite" Plastic film 48" wide x .004" thick and holding to a tolerance of plus or minus 10% on thickness throughout the length and width is a tough test for any calender, but Canadian Resins and Chemicals Limited has no difficulty in maintaining this tolerance on its Dominion-built calenders equipped with Timken Balanced Proportion Roll Neck Bearings.

The Timken Bearing roll neck mounting used on these calenders is shown in the accompanying drawing. The close precision tolerances to which Timken Bearings are manufactured assure accurate and constant gap setting between rolls with resulting close control of product thickness. Furthermore, the calender rolls can be ground on the bearings, making the O.D. of the rolls virtually free from inaccuracies.

Timken Balanced Proportion design gives increased roll neck strength and rigidity, minimum roll deflection and maximum radial, thrust and combined load capacity. Being mounted with a tapered bore on the roll shaft, the bearings are much easier to assemble on the shafts and to remove when necessary. The rigidity of the mounting permits the incorporation of effective bearing housing seals. This prevents spoilage of material by oil leakage. Specify Timken Bearings for your calenders. Look for the trade-mark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.



Application of Timken Bearings on the roll necks of the calenders at Canadian Resins And Chemicals Limited.



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

dry wood pulp have declined by approximately 12,000 tons, the dry, unbleached by 19,000 tons and the chemical wet by 4,000 tons. While mechanical, dry pulp is slightly higher than last year the wet variety is down by 11,000 tons. The increase in the importation of esparto grass is shown by the respective figures of 37,153 tons for January-June, 1946, and 153,255 tons for the same period of this year. Incidentally, rag imports have passed prewar receipts. Material imports from Canada are only about half of last year. Receipts from Finland and Norway are improving but materials from Sweden are only 81 per cent of 1946 and 60 per cent of 1939.

Paper and board imports to date are 246,666 tons against 135,930 tons last year, the former representing 40 per cent of prewar. Wrapping papers and strawboards are chiefly responsible for this improvement on 1946. Among the exporting countries France is now 50 per cent above prewar and both Finland and the Netherlands have passed 50 per cent of 1939.

Despite the coal crisis in the early months of the year exports to date are higher than last year but it is expected that the total for the year will be down on 1946. Exports of coated papers are 100 per cent up on last year and writings have passed their prewar total.

BRIEFS

▶▶▶ FOR THE NEW MACHINE in its Biron (Wis.) mill, the Consolidated Water Power & Paper Company, New York, has placed orders with J. O. Ross Engineering Corporation to furnish a complete heating and ventilating system, machine hood, and Ross-Briner economizers. Additional Ross equipment will include a Ross-Grewin system, motor cooling apparatus, and a modern summer ventilation system.

◆

▶▶▶ THE SALE OF approximately 15 acres of land in Mechanicville, New York, including the former power house of the Hudson Valley Railway Company, to the Walloomsac Paper Company as the site of a proposed paper mill, has been announced by former Mayor Anson B. Collins of Machanicville, owner of the property. The property includes 1,800 foot frontage on the Hudson River, and after extensive reconversion, heavy paper boxes will be manufactured there.

▶▶▶ A CITATION has been presented to the Brown Company (Berlin, N. H.) by *The Financial World* in recognition of its 1946 annual report to stockholders. The citation declared that the company's report was judged as among the most modern from the standpoint of content, topography, and format of the 1,750 reports examined this year.

◆

▶▶▶ PAPER PRODUCTION began in August on one of two new machines at the Mt. Tom (Mass.) division of San-Nap-Pak Corporation. The new machine produces from five to seven tons of tissue stock. Installation of the second machine is under way. The Casper Ranger Construction Company, Holyoke, is building a 254 by 34 feet structure which will house the converting plant where 75 additional workers will be employed.

◆

▶▶▶ A DEMONSTRATION of mechanized log and pulp equipment under the sponsorship of the New Hampshire and Maine Agricultural Experiment Stations, was shown at the Massabesic Experimental Forest station, Alfred, Maine, on August 15th. New type chain saws with chisel teeth, a post peeler, a crawler tractor, and a device for locating hidden metal in logs, together with latest machinery for handling lumber and pulp, were demonstrated by manufacturers and dealers.

◆

▶▶▶ PURCHASE OF the Morrison sawmill at Anacortes, Washington, by the Coos Bay Pulp Corporation, subsidiary of the Scott Paper Company, has been announced by Herman L. Hansen, assistant secretary and resident manager of the corporation's Anacortes division. The sawmill operation will continue until September 30, when title and possession of the plant will be transferred.

◆

▶▶▶ ACQUISITION OF THE property and business of Egg Safety Carton Corporation, New York, by the Robert Gair Company, Inc., New York, has been announced by George E. Dyke, president of the Gair company. There has been a close business relationship between the two companies, under which Gair, from 1933 to 1944, manufactured all cartons sold by Egg Safety, and supplied substantially all their requirements of paperboard since that time. The egg carton business will be set up by the Gair company as a separate department in the folding carton division, and present sales and production personnel will be retained as far as possible.

▶▶▶ INSTALLATION OF a $165,000 electronic precipitator to remove waste materials from gases discharged from the International Paper Company's smoke stack in North Tonawanda, New York, eventually will eliminate the soda ash which has been annoying residents for several months. This statement was made by Stuart Kay of New York City, the company's manufacturing manager, who spoke at a public hearing on the matter in the North Tonawanda Common Council chamber.

◆

▶▶▶ FOR THE FIFTH YEAR successively the Brown Company, Berlin, New Hampshire, is making exhibits at New England agricultural fairs. This year the exhibit is devoted chiefly to small articles that are found on dealers' shelves which are made from company products. Procurement of wood for pulp will again be stressed this year, and a part of the exhibit will deal with sound forestry practices.

◆

▶▶▶ PROGRESS IS REPORTED by Dryden Paper Company (Dryden, Ont.), in the installation of a new and modern machine for the manufacture of kraft or wrapping paper. It is expected the machine will be in operation before the end of this year. The machine will add 60 to 70 tons a day to the company's output of paper.

◆

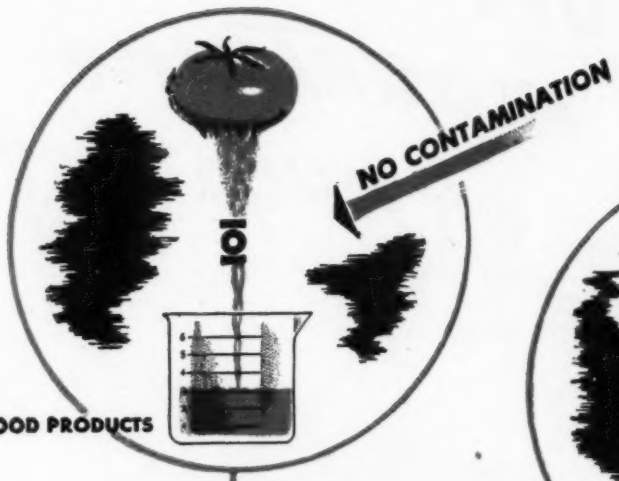
▶▶▶ PURCHASE OF THE Nashville Corrugated Box Company, a subsidiary of Continental Can Company, by the Mengel Company of Louisville, Kentucky, has been announced by Alvin A. Voit and H. A. Eggerss, respective presidents of the Mengel and Continental companies. The plant will increase Mengel's box output by about 20 per cent.

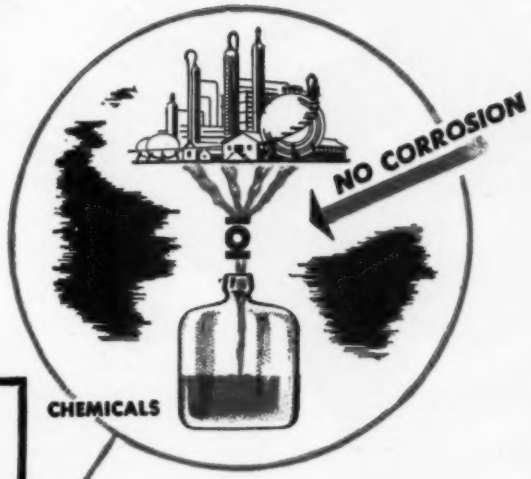
◆

▶▶▶ HIGH BIDDER at an oral auction held by the Forest Services at Bellingham was the Soundview Pulp Company (Everett, Wash.), which bid $67,500 for 12,000,000 board feet of timber, mostly hemlock, in the Mount Baker forest. The Nettleton Timber Company of Seattle bid $67,050 for the same timber.

◆

▶▶▶ A CONSTRUCTION project for a $400,000 building at Portland, Oregon, has been awarded to the L. H. Hoffman Company by Fibreboard Products, Inc. Production of folding paperboard boxes will start when the building is completed sometime next spring. The building will be 200 by 600 feet with concrete foundation, floor, and walls.





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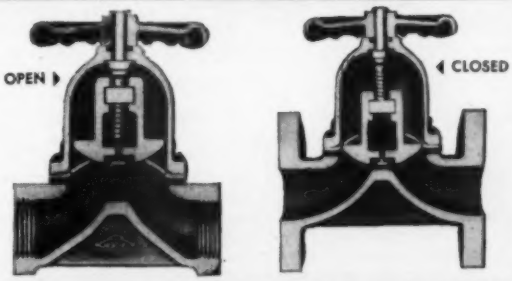

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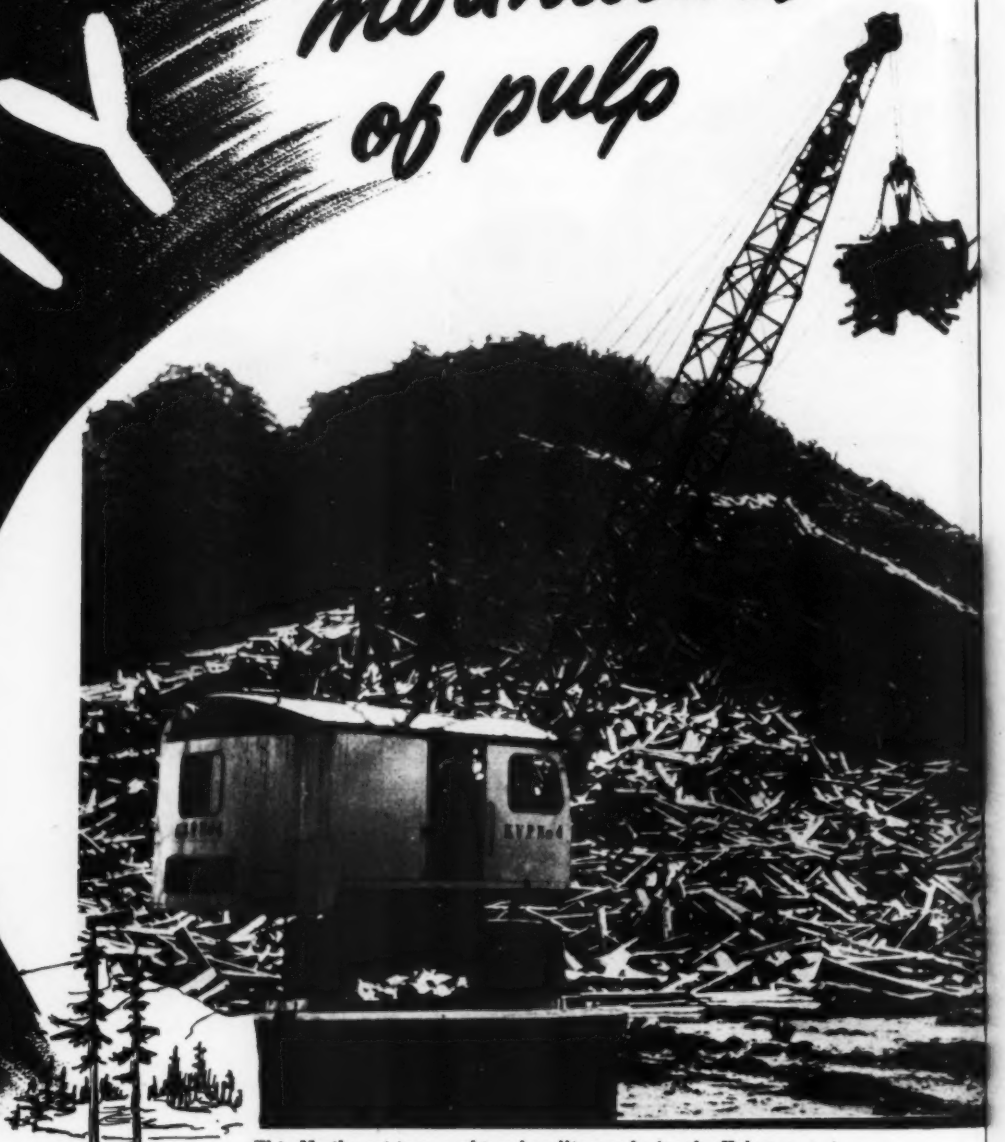
DEPENDABILITY for handling mountains of pulp



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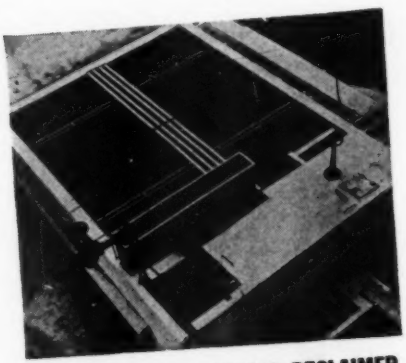

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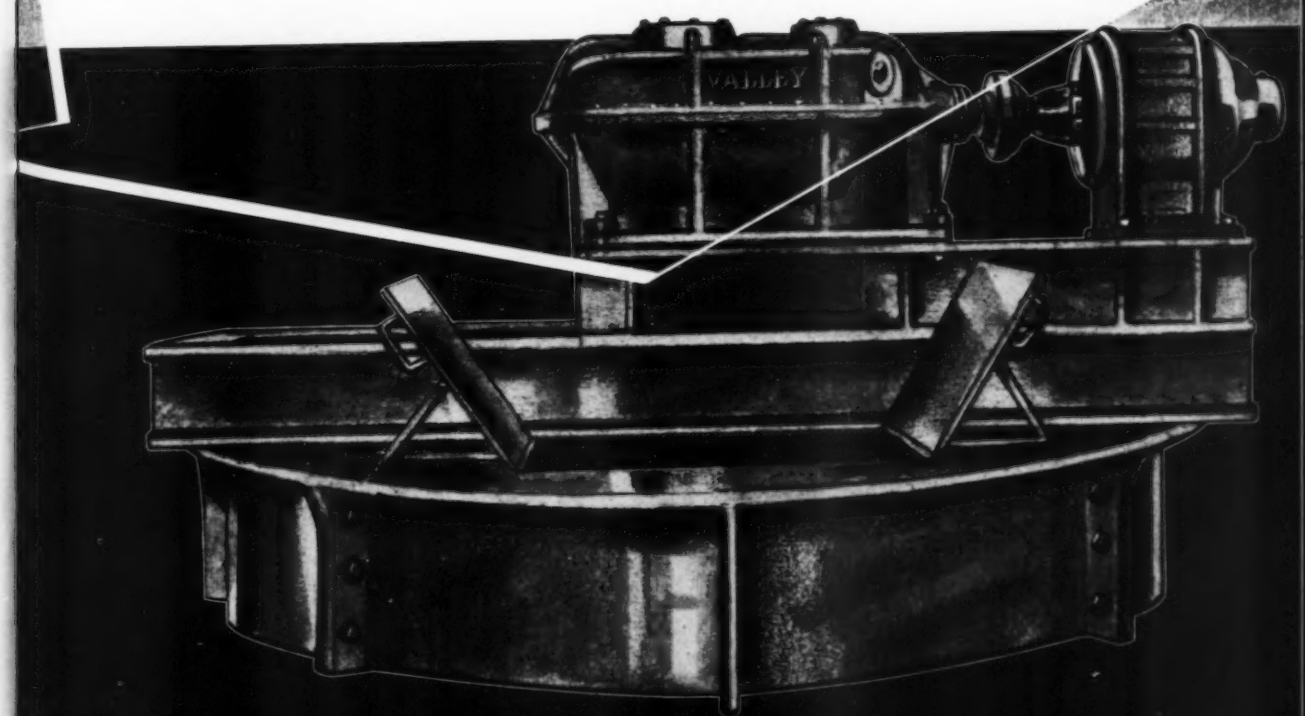

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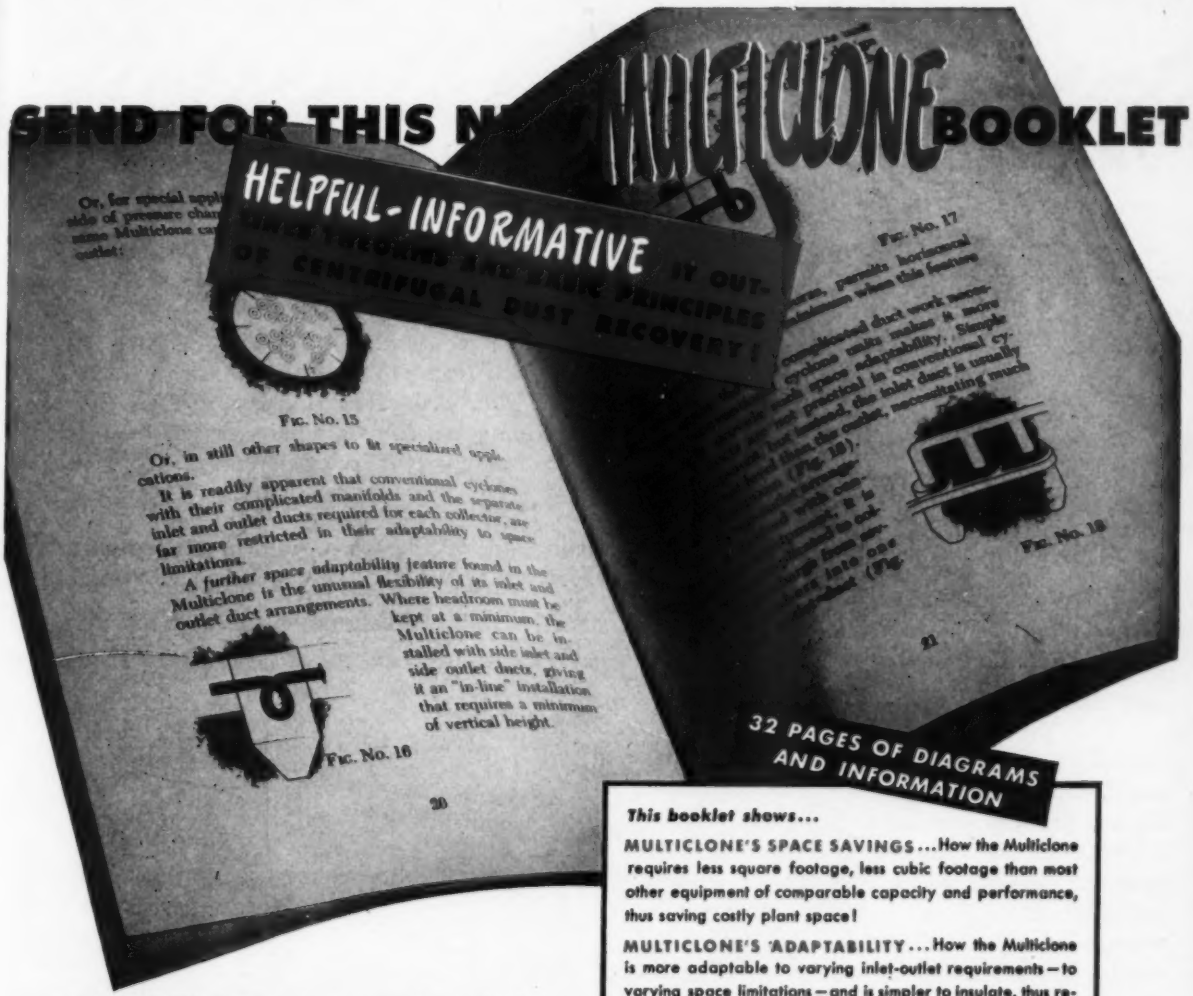

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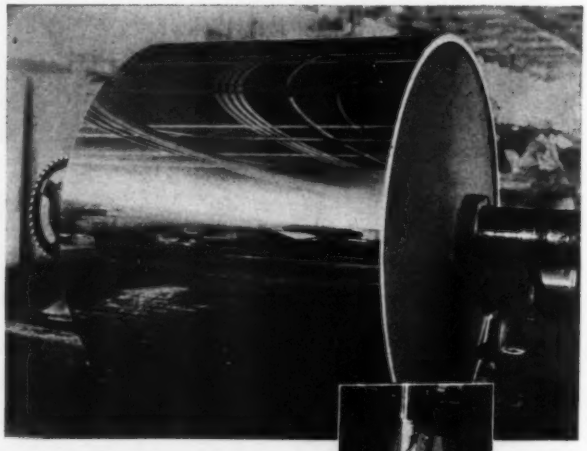
Chromium is the hardest commercial metal. Industrial CRODON-plating greatly prolongs equipment life and provides substantial operating economies. CRODON-plated equipment guarantees a better product. New-equipment performance is maintained for extended periods. Freedom from product contamination and attainment of more perfect finishes are substantial advantages. The normal life of parts is prolonged by chromium plating. Equipment replacement is less frequent. Maintenance expense and operating delays are reduced. The consistently satisfactory performance of CRODON-plated equipment also provides many other economies.

The trade-mark CRODON assures the best in chromium plating. CRODON is the dependable guarantee of the most practicable and economical service available. Behind every CRODON application are the resources, experience and reputation of America's oldest and largest industrial chromium plating organization.



Surface protection, long wear and a better finished product result from this high-lustre CRODON-plated 6-ton steel drum, 6' diameter x 5' face.

Chromium plating of small tools and parts is practical, inexpensive and provides many operating benefits.

Write for further information.

CRODON PLATING pays

Chromium Corporation of America

Executive Offices—120 Broadway, New York 5

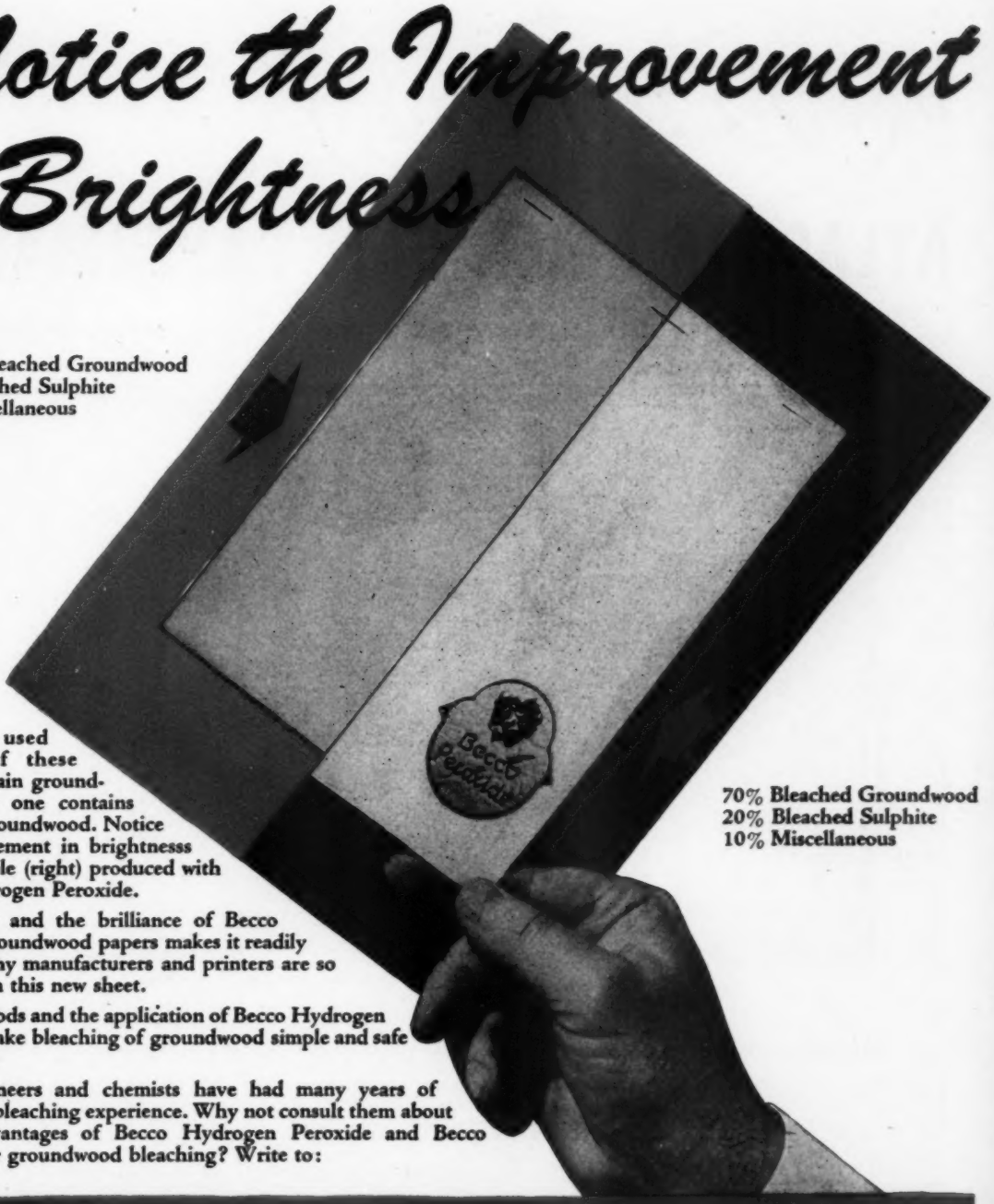
346 Huntingdon Ave.
Waterbury 90, Conn.

1760 Lakeview Road
Cleveland 12, Ohio

4645 West Chicago Ave.
Chicago 51, Ill.

Notice the Improvement in Brightness

70% Unbleached Groundwood
20% Bleached Sulphite
10% Miscellaneous



70% Bleached Groundwood
20% Bleached Sulphite
10% Miscellaneous

The pulp used in both of these papers contain groundwood, only one contains bleached groundwood. Notice the improvement in brightnesss of the sample (right) produced with Becco Hydrogen Peroxide.

The clarity and the brilliance of Becco bleached groundwood papers makes it readily apparent why manufacturers and printers are so interested in this new sheet.

Becco methods and the application of Becco Hydrogen Peroxide make bleaching of groundwood simple and safe in the mill.

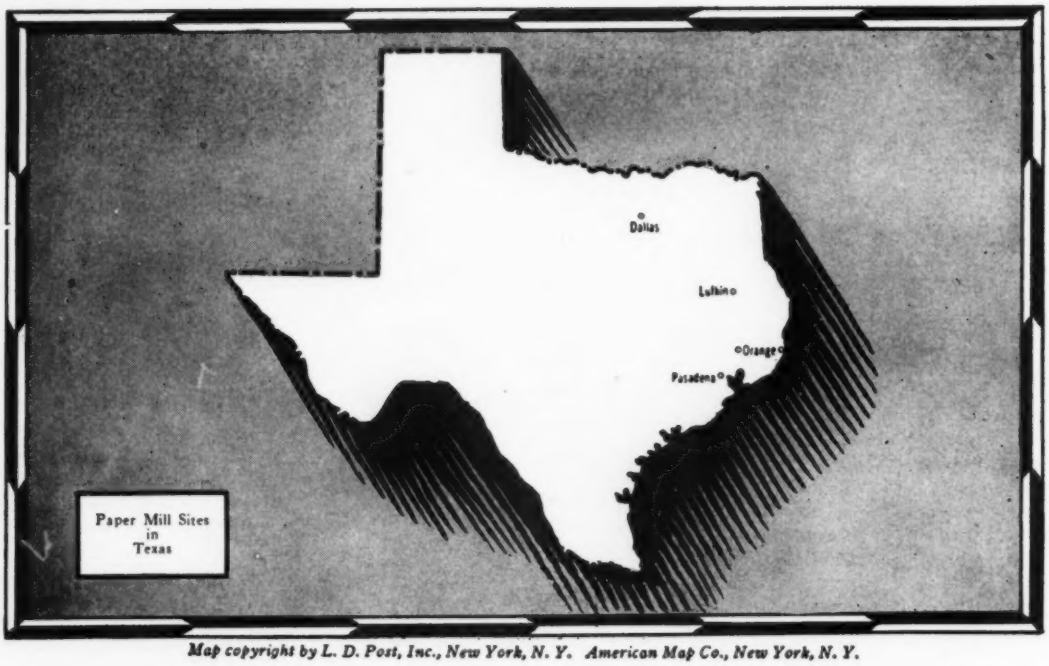
Becco engineers and chemists have had many years of specialized bleaching experience. Why not consult them about all the advantages of Becco Hydrogen Peroxide and Becco methods for groundwood bleaching? Write to:

BECCO SALES CORPORATION
AGENTS FOR BUFFALO ELECTRO-CHEMICAL COMPANY, INC.
10 Sawyer Avenue, Buffalo 7, N. Y.

Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 33 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS



Map copyright by L. D. Post, Inc., New York, N. Y. American Map Co., New York, N. Y.

HIGHLIGHTS: Texas pioneered in the use of yellow pine for making pulp when the Letcher Moore Lumber Company erected a soda pulp mill at Orange in 1904. It shifted to making sulphate pulp in 1911.

In Texas, also, the first newsprint mill using this species of pulpwood was started at Lufkin. The manufacture of kraft pulp began only two years after it was first produced in the United States.

There are but four paper mills at present in the State, which ranks 23rd in the amount of annual production. Each makes a different sort of paper. The machine equipment includes five Fourdriniers and one cylinder machine.

Draper Felts for Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

Canton, Massachusetts

RALPH E. BRIGGS Sales Manager

BRADFORD WEST, PITTSFIELD, MASS. | WILLIAM N. CONNOR, Jr., CANTON, MASS. | L. H. BREYFOGLE, KALAMAZOO, MICH. | WALTER A. SALMONSON, 519-20 WHITE BLDG., SEATTLE, WASH. | L. L. GRIFFITHS, Jr., KALAMAZOO, MICH.

G

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Cotton Rolls	Granite Press Rolls	Ventilating Fans
Interleaved Rolls	Glassine Supercalenders	Rag Cutters
Paper Rolls	Web Supercalenders	Paper Dampeners
Embossing Rolls	Friction Calenders	Tensile Testers
Chilled Iron Rolls	Embossing Calenders	Mullen Testers
	Laboratory Calenders	

PERKINS

B. F. PERKINS & SON, Inc.

ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

Vanesta

The Starch Stabilizer

Stops Gelling
Improves Flow
Gives Uniform Consistency

Sample on request

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

Wood Pulp Shortages Can Be Remedied

▶▶▶ THE SECOND YEAR after V-J Day was completed on August 14. Contrary to all predictions and consumer expectations, the demand and supply relationship in the paper industry is tighter at the end of two years of operation than it was at V-J Day.

Why? What caused the disappointment?

There is one answer to those questions: The demand for paper products since V-J Day has exceeded the supply by an increasingly heavy percentage.

What caused this excessive demand?

To be specific, the combination of a number of factors:

First.—The impact of war, and its drain upon the forests of this country.

Second.—We emerged from this war to find that wood is the lowest cost universal raw material from which almost every commodity necessary to human life can be produced, and for which there is as yet no existent substitute.

Third.—The loss of practically all of our supplies of wood pulp and paper from Europe, especially imports from Scandinavia.

Fourth.—The lack of any installation of additional wood pulp capacity in this country during the war years.

Fifth.—The amazing increase in population in this 1940-1950 decade alone is more than doubling the number of consumers in the 1930-1940 decade. For this increase no additional production was provided.

Sixth.—The enormous expansion in the demand for all classes of commodities by the increased population of this country, and the shortage of supplies in the outside world, demands that we satisfy their needs.

If these factors are not enough to account for the paper products shortage, take a look at the almost insuperable hurdles that confront the paper industry of this country in its endeavor to provide more production.

Shortage of pulpwood areas in the United States in which mills can be constructed economically.

High construction costs—more than double prewar costs per ton of daily production—plus shortage of materials and delays in procurement.

Agitation of propositions to build mills in Alaska and in the vast regions of the Rocky Mountains, both testifying to the drastic paper products shortage and both involving economic problems hitherto unknown in the industry.

Personally, we see no chance of any material relief from plans laid along the lines of prewar thinking or operations.

We do believe that there is a way to ready relief and that is to cease cutting our timber forests into lumber. Instead, let the timber be put through digesters and made into building materials, or let it be fabricated into plywood instead of being put through the sawmills with an enormous waste of wood. Then there will be timber sufficient under our conservation and reforestation plans to service all demand.

In 1937, of the total timber cut in our forests, we only got 28 per cent for commercial use. Seventy-two per cent was wasted in logging, manufacturing, and fuel and fire waste. We must convert that huge waste into usable commodities. *It can be done.* In 1937, Germany recovered 64 per cent of its timber cut for usable purposes with only a 36 per cent waste.

Education in Safety

▶▶▶ UNNECESSARY EXPOSURE to danger is listed as the cause of 31 per cent of the permanent disabilities and deaths in the paper and pulp industry for 1946, in the report of the National Safety Council.

Safety engineering has become increasingly valuable to management, and one of the most important subjects discussed wherever industrial leaders gather is that of safety education.

The 23rd contest among members of the Paper and Pulp Section of the National Safety Council closed on June 30. Two hundred and fifty-eight companies participating in this contest finished the twelve months as compared with the 228 mills that finished the previous contest. Thirty-five new registrants have entered the 1947-1948 contest now under way, showing a substantial increase in participants over the previous year.

This increased participation in safety contest activities shows that the paper industry is awake to the urgent need for reducing its accident rate. The 1947 edition of *Accident Facts*, just released by the National Safety Council, shows the frequency rate of the paper and pulp industry is still higher than that of 29 other industries; the severity rate is higher than 26 industries. A comparison of the frequency and severity rates in the paper and pulp industry for the past two years is as follows:

	1945	1946
Frequency (disabling injuries per 1,000,000 man hours)	20.52	22.27
Severity (Days lost per 1,000 man-hours)	1.42 (69)	1.63 (73)

Another important safety movement within the industry this year is the Third Bolton Award Contest which is conducted annually under the auspices of the American Pulp and Paper Mill Superintendents Association and sponsored by John W. Bolton and Sons, Inc. This contest is open to members of the Superintendents Association and to all employees of North American pulp and paper mills. The subject chosen for the awards to be presented this year is "My Plan for Improving the Safety Record in the Pulp and Paper Industry."

The wide scope of this contest and the individual ideas it will bring in may result in some new and vitally effective safe practices. This contest of ideas most certainly will prove of inestimable value in the safety educational work within the industry. It also co-ordinates the work of the Superintendents Association with the intensive organized activities of the National Safety Council.

Retrospectively Speaking . . .

WILLIAM SIBLEY

AS A NATION we are not feeding our piggy banks as generously as we have been—or as we might. And that isn't so good, because if we are to enjoy the much-vaunted period of prosperity we must have some money in the sock to take care of expenditures. During the year of 1945, the American people laid away something over $29,000,000,000. The following year, when the war-emergency incentives had evaporated and many folks ceased buying government bonds, we saved only $14,800,000,000. Now, during 1947, the rate of saving is down to $11,800,000,000.

Decline in Rate of Saving

Not only are we saving less money than we could (and, in the considered opinion of many, should) but the savings are rapidly falling into the hands of the relatively few in the well-to-do upper-brackets. While in the low-income group of families the savings of 1945 came from 70 per cent of that total, today, only 4 per cent of the people of this group are saving money. Many are spending more than they earn which means they are dipping into the savings accumulated during the war years.

In the middle-income group ($3,000 to $5,000) something like 75 per cent are still saving money, even though in comparatively small amounts. By far the larger volume of savings comes from the upper-income group ($5,000 to what-you-wish), with insurance companies, banks, investment houses, and trusts accounting for the majority of even that total.

It is interesting to know how savings are assigned—occupationally. *Veterans* were perhaps the hardest hit of all the several groups. Very few of them found they could save anything at all; most of them dipped into accumulated surpluses. About one-third of the vets' families spent more than they earned during 1947. *Managers and self-employed* are the best of all savers. More than 80 per cent of this group consistently save; 36 per cent of them save more than $1,000 per year. *Professional people* come next, with 77 per cent saving money, and some 29 per cent saving more than a grand a year. *Clerks and sales people* (and this group includes general office help) run in the "show" place of this race. And third place here pays off some 70 per cent as being savers, and 20 per cent saving more than $1,000 per year. But *farmers* do pretty well by themselves, too. They would run neck and neck with the clerks in a photo finish. *Skilled workers* were fifth, and *unskilled workers* last. But even here—in spite of high cost of almost everything needed—54 per cent saves at least "some" money. *Retired folks* ran a bit ahead of the unskilled worker—some 3 per cent saving more than $1,000 per year. Dr. Townsend, please note!

Speaking of Billions

It is interesting to look over the list of American business enterprises which, individually, own more than one billion dollars in assets. There are forty-five of them. Now a billion dollars is a lot of dough. (It's a lot more'n you or I will see in our lifetime—yes, even all put together!) An entire industry that grosses one billion dollars is accredited as being quite an industry. Yet—and this may kill you—the Metropolitan Life Insurance Company currently has assets of well over *eight* billion dollars. Bell Telephone's assets amount to more than 7-1/3 billion. Wrong? No, certainly not! "Wall Street"—"watered stock"—"concentrated riches"—"privileged few"—you say? *I* say "horse-radish to all that Boss Tweed, Frenzied Finance, Teddy Roosevelt "trust," "damn the public" talk of long ago.

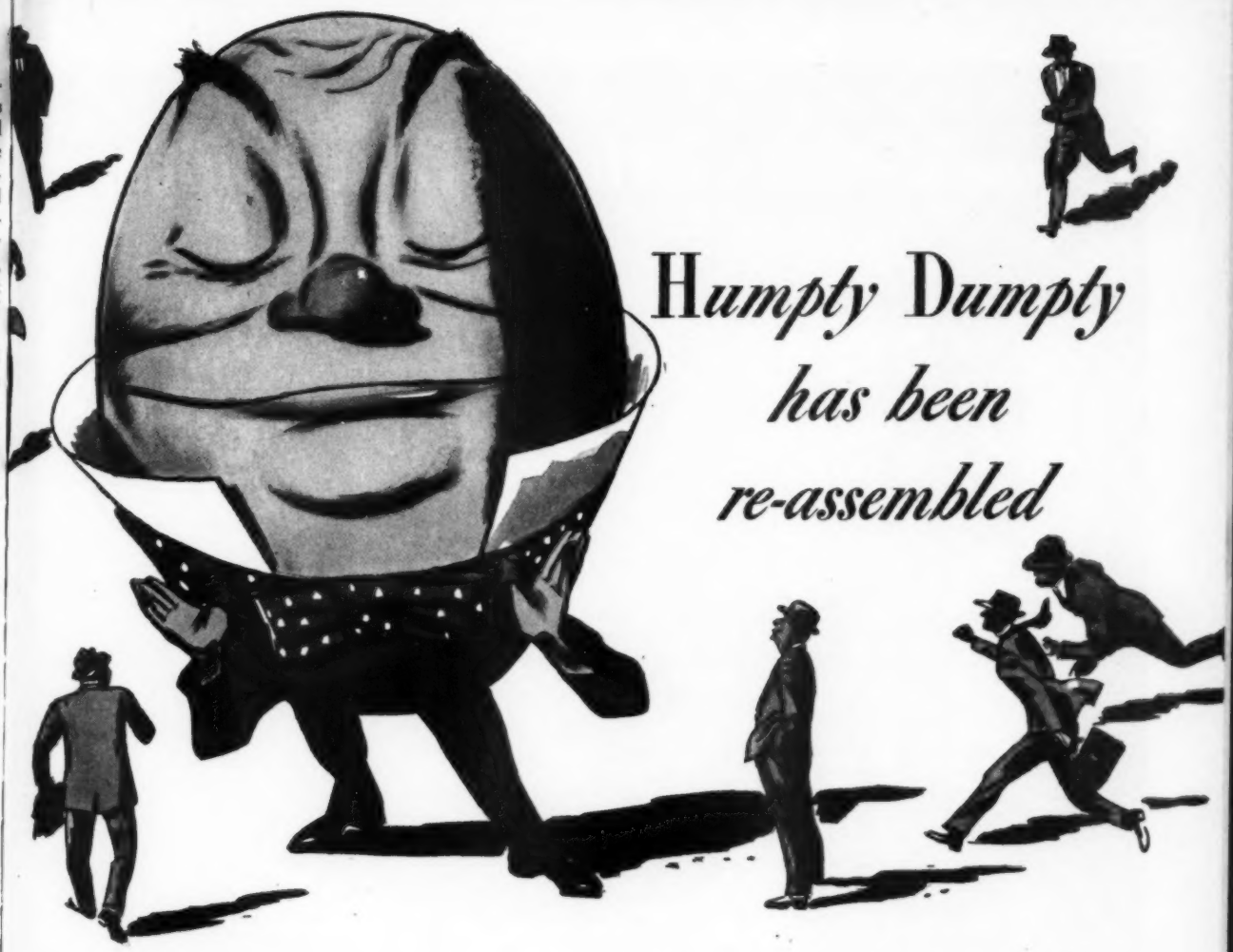
I, personally, say it is a darned good thing that the billions of this nation are concentrated in the hands of people who can make this American clock of ours tick—and tick louder—and TICK louder and TICK LOUDER. Here's the sort of hairpin *I* am: I wish the Postal Department was under private ownership, just like A. T. & T. There are several things I know: (a) the Government would be paid taxes on a lot of property now occupied by a tax-free agency; (b) we would get better, more courteous service; (c) the taxpayers would not be called upon to make up a deficit every year, in spite of magicians with the slide rule in Washington, as of now, and (d) the stock revenue from the postal department company would put dough into the pockets of hundreds of thousands of people—just as it does, today with the 45 concerns whose assets exceed one billion dollars.

Government Ownership Advocates Beware

If there is anything truly substantial to socialism (state ownership of public utilities, the which is better described as Communism in a tuxedo)—then tell me why in the name of all that is social should there be more stockholders and bondholders in private enterprises than ever before. In 1931 there were some 8,557,000 stockholders in 132 companies. Now there are more than 10,500,000 stockholders in 213 companies. Hail Columbia! It's a Republic!

Pump Us Hot Pump Us Cold

One of the most successful heating and cooling devices (for individual dwellings) is a simple little pump which, during winter, draws the comparative warm air out of the below-frost-line earth and, after heating, pumps it throughout the house. Then, in summer, it pumps the comparatively cool air from the same earth and forces it through the (otherwise hot) house. Cost: nominal for installation, and amazingly low in maintenance and operation. Ashes, dust, dirt, backache, wiggly-eyes, swollen arches—nope! This is 1947.



Humpty Dumpty has been re-assembled

It took considerable doing—this stem-to-stern rehabilitation of Moore & White.

But now it's all over but the shouting, which you may expect to continue for some time.

What do we find to shout about, as we round out our first year under new management? First and foremost, a sixfold increase in business . . . positive proof that the confidence and loyalty of well-served customers is an enduring asset. No less gratifying is the proof that candor and forthrightness pay off in business.

We are doing our utmost to justify the faith of customers—old and new—who took at face value our cards-on-the-table announcement of the rejuvenation of Moore & White. We are better prepared than ever before in our 62-year history to make good on our assurance of finer engineering, production, installation, and servicing of custom-built paper-making machinery.

We're set up, too, to convert "backlogs" into deliveries in a shorter time than you might believe possible.

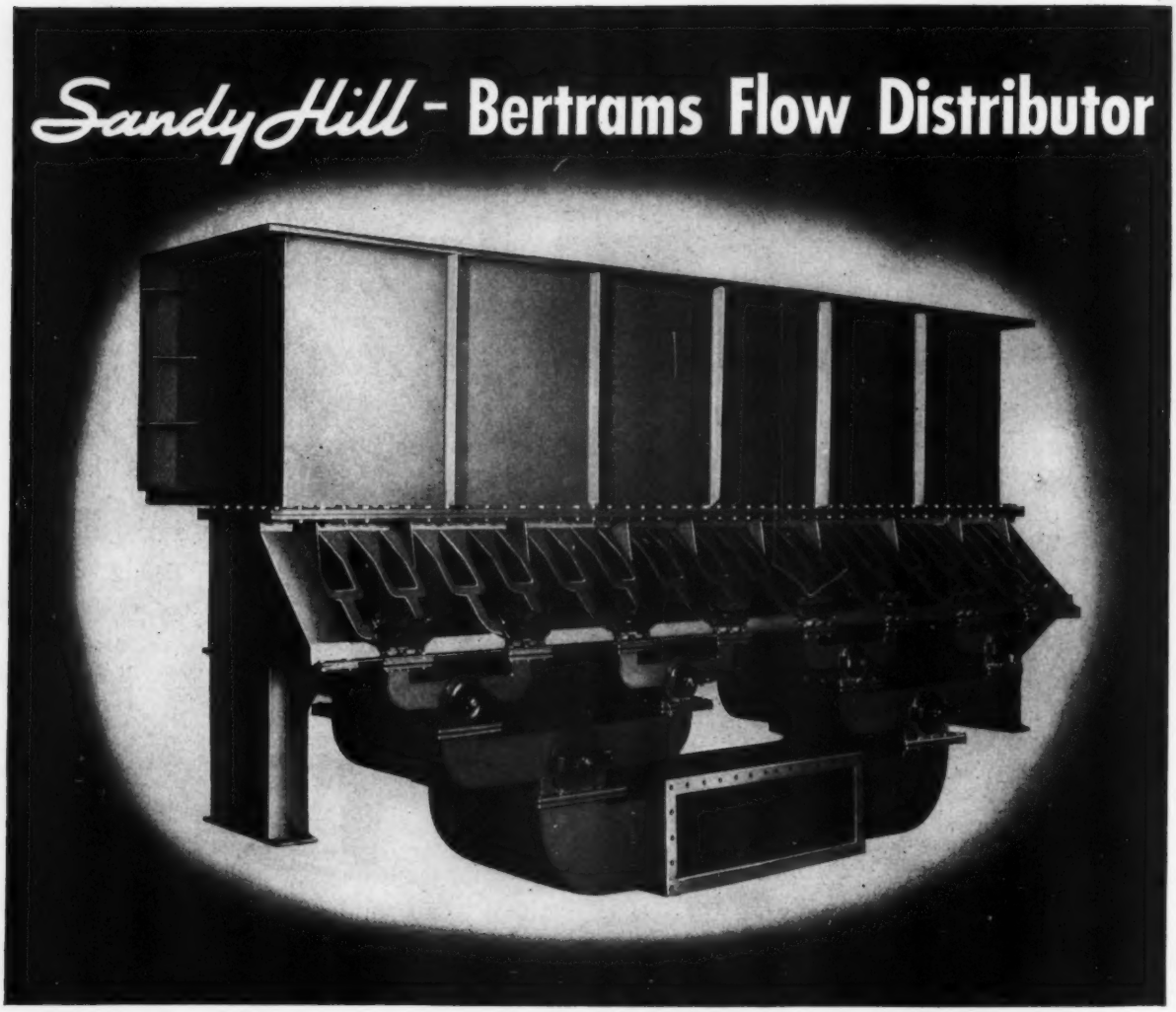
If you have need of equipment for making paper or similar products, call upon us for the best engineering brains in the industry. We'll tackle your toughest problems . . . come up with the right answer, every time.

The MOORE & WHITE Company

15TH STREET AND LEHIGH AVENUE • PHILADELPHIA 32, PA.

CUSTOM BUILDERS OF PAPER-MAKING MACHINERY

Sandy Hill - Bertrams Flow Distributor



1: Stock uniformly spread over entire width of machine, regardless of consistency, tonnage or speed.
2: Equal distance traveled by every particle of stock, whether delivered at edge or center of any machine.
3: Contributes to the production of paper of more even caliper and more uniform strength.
4: Reduces cockling due to formation to absolute minimum.
5: Effects more uniform drying because of greater uniformity in sheet.
6: Controls mixing of stock and discharges it in perfect condition for forming sheet with longer fibers and good formation.
7: Installation space is considerably reduced.
8: Cleaner than ordinary types of head boxes.

Repeat orders are delivered or in process for book papers, waterleaf, and waxing tissue. Makers of other kinds of papers have satisfactory installations.

Structural Improvements Add to Already Proven Benefits

The Sandy Hill-Bertrams Flow Distributor is custom designed and custom built to fit YOUR paper machine . . . whether fourdrinier or cylinder.

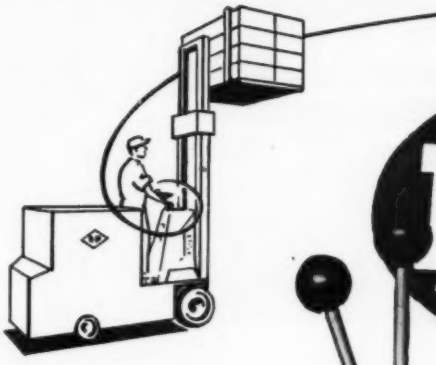
The newly designed manifold channels are precisely constructed to give the utmost uniformity in distribution of stock across the entire width of the machine.

The equal volumes of stock emerging onto the apron from the flow passages travel at equal rates of speed equal distances from the point of entry.

Satisfied users acclaim the high efficiency of the Sandy Hill-Bertrams Flow Distributor. We'll be glad to tell you why . . . write us for detailed information.

THE SANDY HILL IRON & BRASS WORKS
HUDSON FALLS, N. Y.

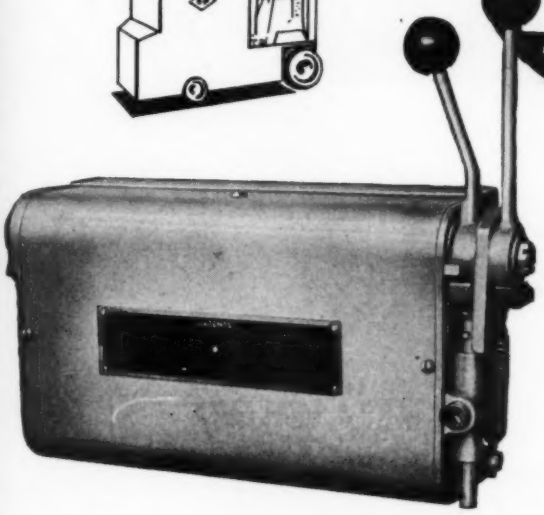
Elwell-Parker leads again with



E. P. E.

ROLOTAC

CONTROLLER



the electric truck controller based on an entirely new principle!

Elwell-Parker has developed the ROLOTAC controller to withstand the heavier loads, and more frequent starting and stopping encountered with modern trucks. ROLOTAC embodies a new principle for super-speed—the trigger snap and rocking action assure an instant make and break at the tips and not on the contact working surface. The breaking of heavier currents is handled by magnetic blowout. ROLOTAC has larger contacts and greater current capacity. It conserves power, requires less service, and assures continuous handling of larger loads in less time. ROLOTAC includes all well-known E-P safety features, such as the "dead-man" control. It is a worthy companion of the E-P built, Class B Motor—both can take all the power the recommended batteries will furnish.

The most gruelling tests prove ROLOTAC is an extra-husky controller. It has seen two and one-half years actual operation, among others, in one forge shop for over 20 hours per day with over 7,000,000 make and break operations.

Have your E-P man give you full details on this newest superiority of Elwell-Parker Trucks. The Elwell-Parker Electric Co., 4241 St. Clair Ave., Cleveland 14, Ohio.

10 SUPERIORITIES OF ROLOTAC

1. Super-swift snap action.
2. Arc blowout feature.
3. Tamper proof, locked mechanism.
4. Shock proof construction.
5. Interchangeability of fingers and contacts.
6. Extra large contacts.
7. Positive, efficient transfer of current.
8. Accommodation of no plug feature.
9. Four speeds in both directions.
10. No adjustments required.

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

Established 1893

In Any V-Belt Only the SIDES Touch the Pulley

The Sides Do ALL the GRIPPING

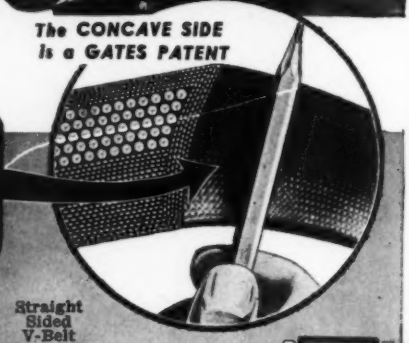
Diagram of V-Belt in Sheave Groove

— Naturally, It's the *SIDES* that GET the WEAR!

The moment you look at a V-belt in its sheave, you see that the *sides* do all the *gripping*—They get *all the wear* against the sheave groove wall. The sides *pick up* the load. They transmit that load to the belt as a whole. And then, once more, the sides—and the sides alone—take hold of the driven pulley and deliver the power to it.

This simple fact explains why you have always noticed that the *sidewall* of the *ordinary* V-Belt is the part that *wears out first.*

★Now See How the *Patented* CONCAVE SIDE *REDUCES Sidewall Wear - Lengthens Belt Life!*



The CONCAVE SIDE Is a GATES PATENT

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt. The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

Straight Sided V-Belt

Fig. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

Fig. 1-A

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Fig. 2

Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.

Fig. 2-A

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

★More Important *NOW* That Gates SUPER V-Belts are Available

Now that Gates *Specialized* Research has resulted in Super V-Belts capable of carrying much heavier loads—up to 40% *higher horsepower ratings* in some cases—the sidewall of the belt is called upon to do even *more work* in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important NOW than ever before!

THE GATES RUBBER COMPANY DENVER, U. S. A.

"World's Largest Maker of V-Belts"

479

GATES VULCO ROPE DRIVES

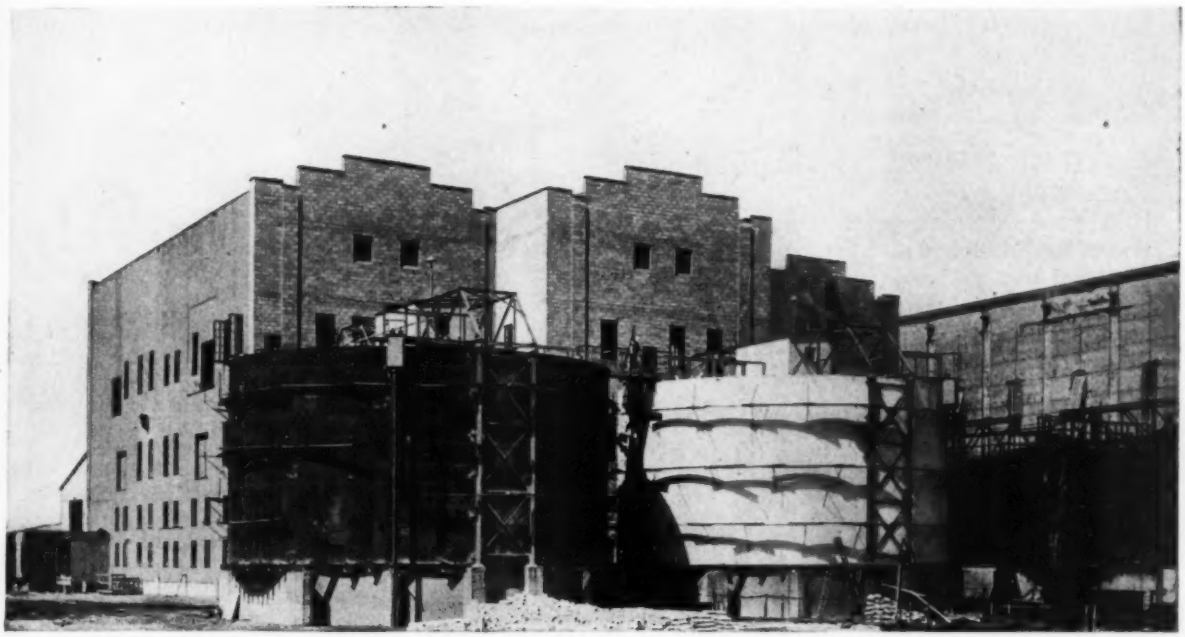
Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Gates

THE MARK OF SPECIALIZED RESEARCH

IT'S IN PRODUCTION!

More Precipitated Calcium Carbonate for the paper industry is available from Wyandotte's great, new $2,000,000 plant



CONSTRUCTION COMPLETED — PRODUCTION BEGUN! *Here's the new Precipitated Calcium Carbonate plant at Wyandotte, Michigan. It is now going full blast to meet the great demand of the paper industry for this superlative coating pigment.*

YES, it's great news for many paper-makers that a bigger supply of Wyandotte Precipitated Calcium Carbonate is now assured.

The demand has been terrific — for you paper-makers *know* that this Wyandotte product has the quality and uniformity you require. Wyandotte spent $2,000,000 to meet your needs — so you can keep *your* customers happy with the best in coated paper.

Technical bulletins about the use of Wyandotte Precipitated Calcium Carbonate are yours on request.

WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

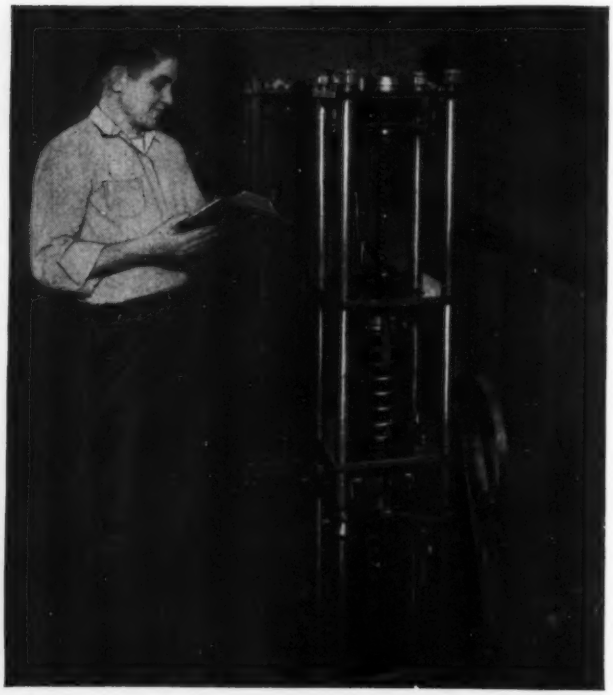
Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine • Hydrogen • Dry Ice • Glycols
Ethylene Dichloride • Propylene Dichloride • Chloroethers • Aromatic Sulfonic Acid Derivatives • Other Organic and Inorganic Chemicals

Wyandotte
REG. U. S. PAT. OFF.

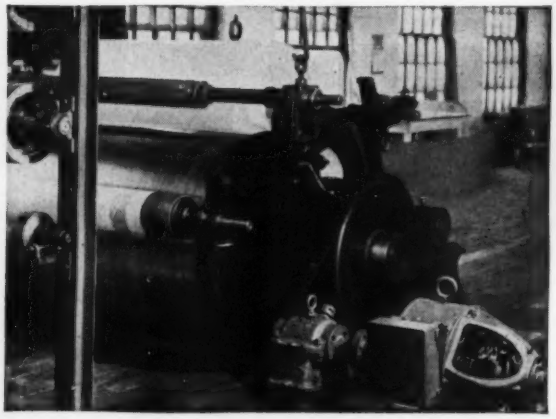
do you know Roller Chain...

is actually elastic!

❶ AND HERE'S WHAT that means to you. Where your equipment is subjected to momentary overloads and sudden strains, the inherent elasticity of roller chain will help absorb those damaging shocks and protect your equipment.



❷ WE'VE ACTUALLY PROVED that roller chain is elastic. With this testing machine, designed and built by our engineers, we stretch this small section of Baldwin-Rex Roller Chain about ⅛-inch with each load application. We do this more than 10,000,000 times. Each time the chain must withstand the load and retract to its original length in order to meet our rigid specifications.



❸ TAKE THIS COATING MACHINE. The elasticity of that Baldwin-Rex Roller Chain drive absorbs the shock loads . . . delivers the smooth, positive flow of power so necessary for even coating. Throughout your mill, you'll find this elasticity a big help in reducing spoilage and stepping up production.

You can simplify replacement, generally cut costs and improve deliveries by specifying standard roller chains. Your Baldwin-Rex Man will be glad to give you all the facts and help you with your application problems. Call him or write us direct.

BALDWIN·REX

ROLLER CHAINS

BALDWIN-DUCKWORTH DIVISION OF CHAIN BELT COMPANY

367 Plainfield Street, Springfield 2, Massachusetts

All piping equipment . . . All pre-fabrication . . . on One Order to CRANE

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

Pipe fabrication of every sort is Crane Co.'s business. From a simple bend to the most complex welded assembly, your design is assured of precise fabrication. Fully equipped, skillfully manned and strategically located, five Crane Pipe Shops are at your service.

Calling in Crane is the simplest procedure on any piping job. One order covers everything . . . valves, fittings, pipe, and shop-fabricated units. You avoid any worry about fit in the field . . . or performance. Standardizing on Crane Shop Service and the Crane Equipment Line gives you this 3-way advantage—

ONE SOURCE OF SUPPLY offering the world's largest selection of steel, iron, and brass piping materials for all power, process, and general service applications.

ONE RESPONSIBILITY for piping materials—helping you to get the best installation, and to avoid needless delays on jobs.

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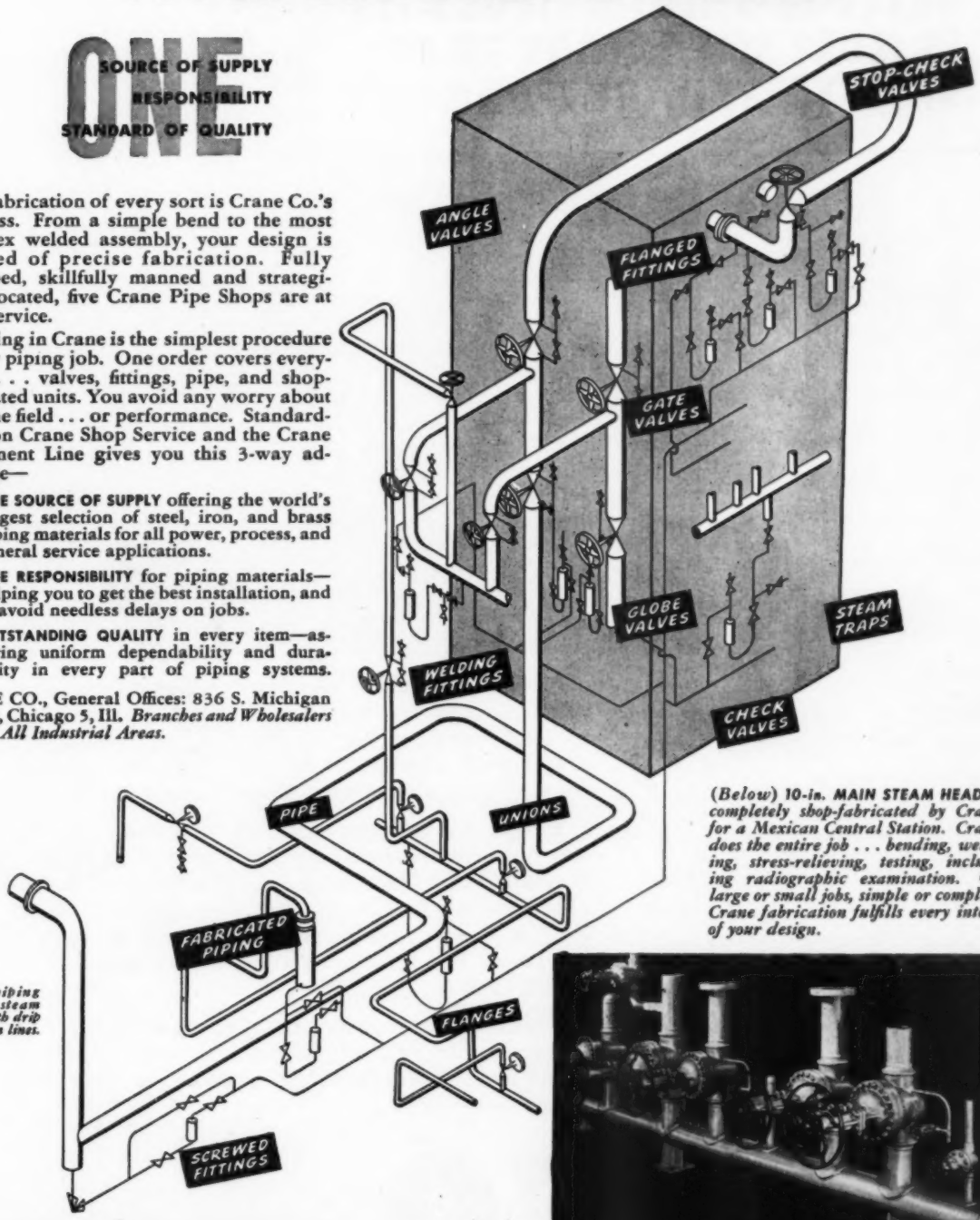

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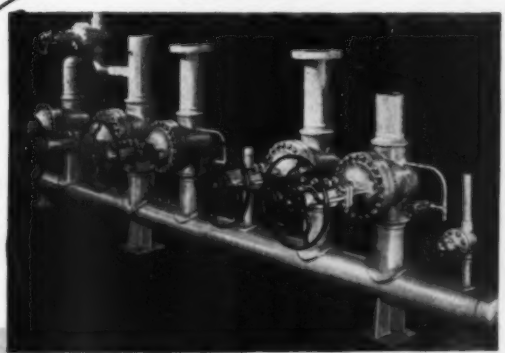

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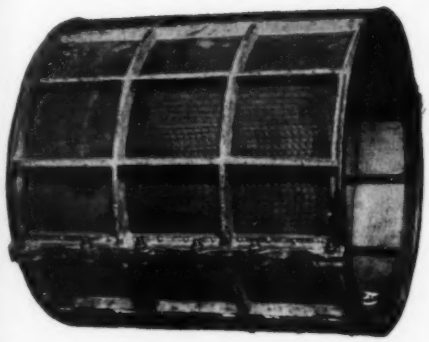

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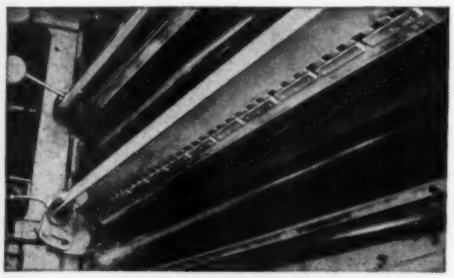

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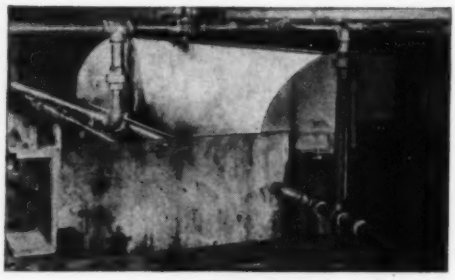

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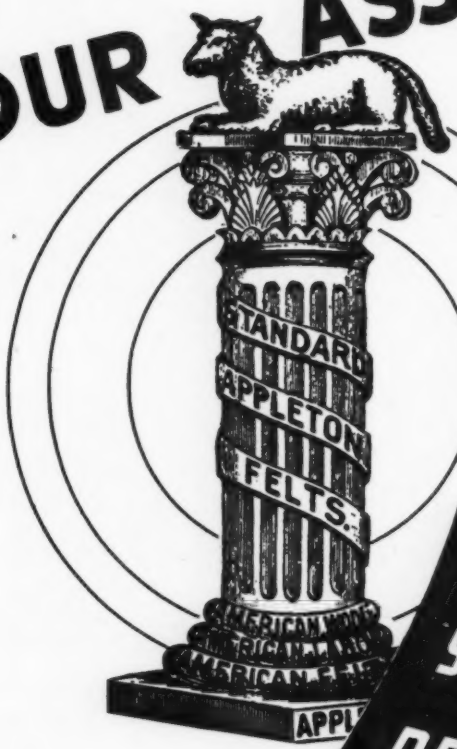

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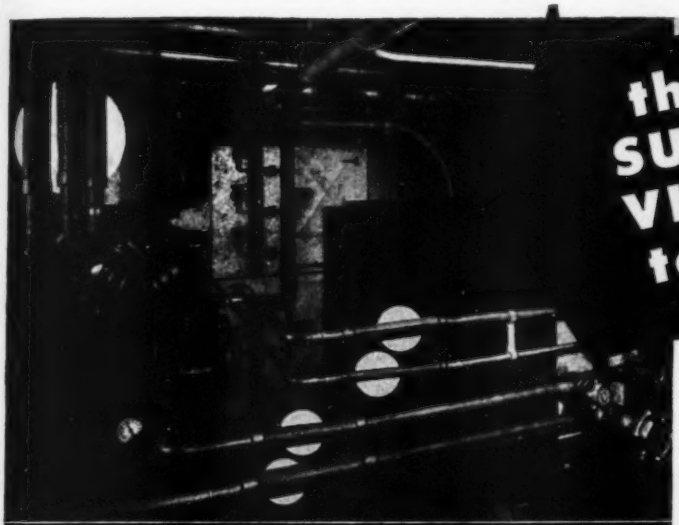

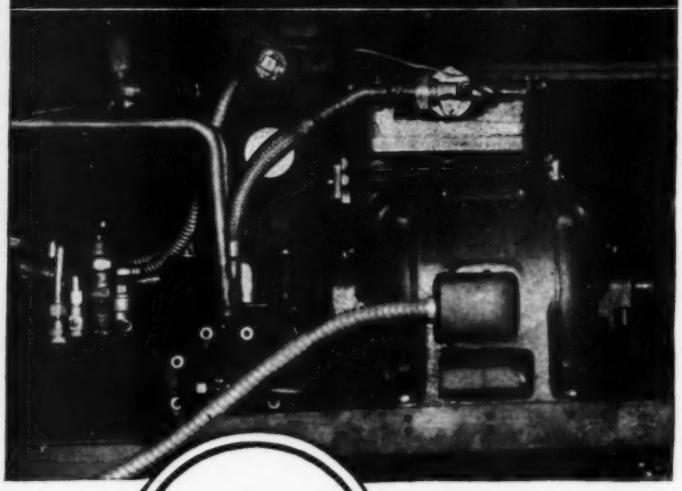

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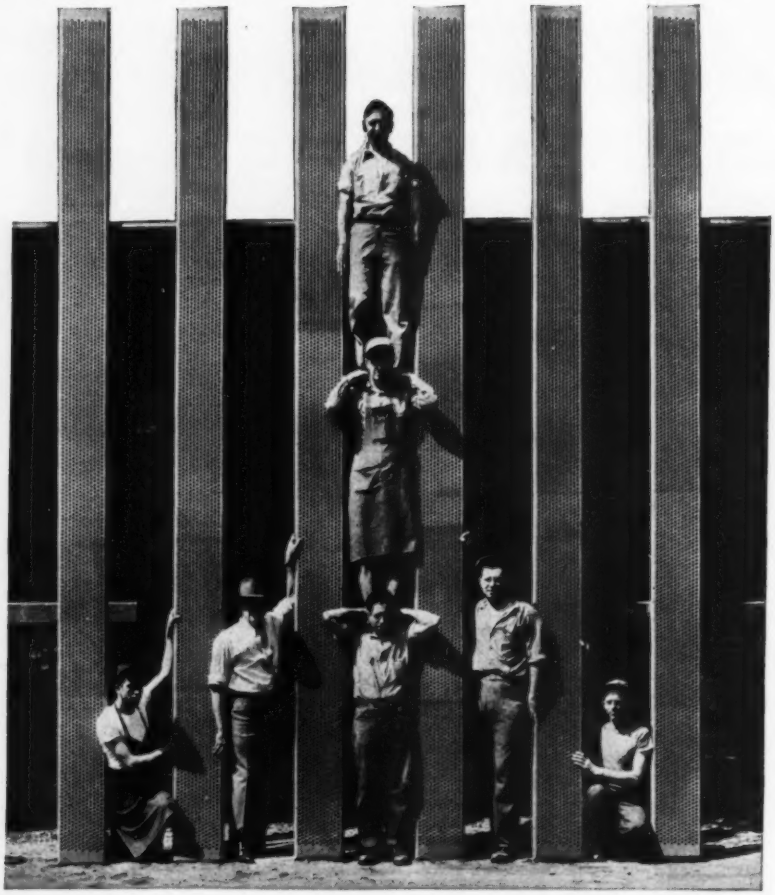

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THE PAPER INDUSTRY
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SEPTEMBER 1947

◆

HEMICELLULOSES . . . . their importance to the Pulp and Paper Industry

LOUIS ELSBERG WISE
The Institute of Paper Chemistry

▶▶▶ ABOUT EIGHT YEARS AGO, under a slightly different title (*1*) an article on the hemicelluloses appeared in THE PAPER INDUSTRY AND PAPER WORLD. This earlier report is now being simplified and brought up to date. Accumulating experimental evidence shows that the hemicelluloses play an important role in the manufacture of pulp and paper; that their presence or absence materially affects pulp quality; and that they may be the precursors of some desirable and some undesirable by-products.

A pulpwood chip (irrespective of the nature of the wood) contains *cellulose, hemicelluloses, lignin, mineral matter,* and varying amounts of *extractives.* Pectic materials also may be present in subordinate amounts. Of these components, cellulose and the hemicelluloses are the polysaccharides of the cell walls of wood. Frequently, these two components are spoken of collectively as *holocellulose.* In the original structural fabric of the wood, both of these constituents are insoluble in water, and in such solvents as alcohol, gasoline, ether, acetone, and benzene. There are indirect experimental data indicating that a part of the hemicelluloses are linked chemically with the lignin. Another portion is so closely related to cellulose that its separation becomes very difficult. No attempts to define and to delimit the hemicelluloses have been entirely successful. Actually, there is no sharp line of demarcation possible between the more resistant of the hemicelluloses and "true" cellulose itself. This point of view has been expressed quite fully in a recent publication (*2*). On the other hand, if extreme care is taken to *standardize* methods of isolating the hemicelluloses of wood, quantitatively reproducible fractions can be obtained, and these may be separated from what is ordinarily termed "alpha-cellulose." Such quantitative hemicellulose preparations are carried out somewhat as follows: Finely-divided, extractive-free wood is converted into holocellulose by means of aqueous sodium chlorite and acetic acid (*3*), and this holocellulose is extracted successively (under nitrogen) with increasing concentrations of aqueous potassium hydroxide. These alkaline extracts are then filtered promptly and acidified with acetic acid, and then precipitated quantitatively with ethyl alcohol. The sum-total of these carefully dried precipitates (corrected for ash) gives a measure of the hemicelluloses originally present in the holocellulose, and from this may be calculated the percentage present in the original wood. Inasmuch as acetyl groups in the wood appear to be a part of the hemicelluloses, and because such groups are lost in the hemicellulose isolation, these should be separately determined. In softwoods, the hemicelluloses often vary from 14-18 per cent. In hardwoods frequently 23-27 per cent (or more) may be present. These are conservative figures, and are considerably lower than those estimated on purely theoretical grounds some years ago, before a quantitative method had been developed (*4*). However, the fact remains that a typical American hardwood (*e.g.*, aspen) is much higher in the hemicelluloses than is a typical coniferous pulpwood (*e.g.*, spruce).

One of the differences between a coniferous alpha-cellulose fraction and a coniferous hemicellulose fraction is found in the products obtained on acid treatment. Whereas the alpha-cellulose from a softwood gives largely glucose and a subordinate amount of mannose, and very little xylose, the softwood hemicelluloses yield largely xylose, hexuronic acid derivatives, and varying amounts of mannose. The alpha-cellulose from hardwoods on hydrolysis gives *largely glucose* with subordinate amounts of xylose and probably very little mannose (although this is still a matter of conjecture rather than proof). On the other hand, hardwood hemicelluloses give large amounts of xylose together with smaller amounts of glucose and hexuronic acid derivatives and probably little mannose. All hemicellulose fractions contain small but appreciable amounts of methoxyl groups, most of which are associated with the uronic acid units. Although Anderson and his co-workers have made outstanding contributions in this field (*5*), the chemical architecture of the hemicelluloses has not been studied as completely as has that of cellulose (*6*). However, we are justified in saying that the hemicelluloses have a much lower average degree of polmerization (*6a*) than has wood cellulose, and that most of them have a random orientation. Furthermore, most of them are nonfibrous, even though some may be so closely bound to the cellulose that they enter into its fibrous structure. Moreover, the hemicelluloses are much more rapidly hydrolyzed by means of acids than is cellulose itself. Hemicelluloses when once isolated from the holocellulose framework form white friable powders which are partially soluble in water. These powders, unless very

carefully purified (by electrodialysis), contain appreciable amounts of mineral matter. The roles which hemicelluloses play in the pulp and paper industry are threefold:

(a) On hydrolysis they give rise to sugars in sulphite waste liquor that will cause oxygen depletion in the stream into which these wastes are emptied.

(b) Indirectly, they may serve as precursors to important industrial by-products.

(c) They have an important bearing on the quality and properties of pulp and paper.

Perhaps it would be well to discuss first the undesirable role that hemicelluloses may play in the pulp industry.

Oyxgen dissolved in water is necessary to the life of the flora and fauna of any river, lake, or creek. In an unpolluted stream the concentration of this oxygen does not vary very greatly. If, however, this dissolved oxygen is reduced beyond a certain point, the living organisms (the *biota*) suffer, and, in some cases, die. When any oxidizable organic material enters a stream of water, it may make prompt demands on the dissolved oxygen—an "immediate chemical oxygen demand" which is soon satisfied. However, the oxygen-depleting substances (*e.g.*, the sugars resulting from hemicelluloses in a waste liquor) actually may cause certain microorganisms in the stream to multiply very rapidly. The amount of oxygen used by these microorganisms, in converting and stabilizing the oxidizable material so that it can no longer release energy in the protoplasm, is known as the *biochemical oxygen demand* of the waste liquor (*7*). If this demand is too high, the oxygen level in the water will be reduced and fish and other organisms will be affected adversely. Their oxygen supply is lowered often to the danger point. Various methods have been used experimentally in attempting to improve these undesirable effects. One involves the diffusion of compressed air beneath the surface of the river open to pollution. This is spoken of as "river reaëration" and was suggested by Dr. R. G. Tyler, of the University of Washington (*8*). Others involve the various methods of biological treatments. Reference may be made to the so-called "trickling filter" in which waste liquor is subjected to the action of microorganisms (like protozoa and bacteria) over a large surface area *before* the waste liquor enters the receiving waters. Thus in large measure the biochemical oxygen demand may be satisfied in advance and one form of stream pollution can be avoided (*9*).

A more desirable role played by the hemicelluloses is that of precursors to useful by-products of the industry. The same sugars are formed as those that interfere with the oxygen demand of streams—but the sugars are utilized. The sugars can serve as nutrients in the culture of *Torula utilis*, an important and palatable yeast, containing over 40 per cent protein. They can act as substrate for the formation of bakers' yeast—*Saccharomyces cerevisiae*, and, experimentally at least, they have given rise to butanol and acetone by the action of an anaerobic bacterium *Clostridium butylicum*, which grows on the sugars formed during the cook. Needless to say it is possible to obtain ethyl alcohol from the sugars in sulphite waste liquor by suitable treatment and fermentation (*10*). This is not being practiced in the United States, but its success in Sweden seems to be assured. Sweden has six plants for the production of about 7,500,000 gallons of ethanol from sulphite waste liquor. Methanol and fusel oil are by-products. From the sulphite waste liquor of *Mo och Domsjö Aktiebolag* alone, not only are 8,500,000 liters of ethanol prepared, but the yield may be as high as 140 liters per ton of pulp. From this "sulphite alcohol" *over 80 different organic chemicals are produced commercially*—including butanol, acetaldehyde, acetic acid, ethylene oxide and ethylene glycol. This same concern also produces synthetic rubber (known as "Modotiol"), polyvinyl resins, cellulose ethers (such as ethyl cellulose and carboxymethyl cellulose), and even the insecticide "D. D. T." Despite this great diversity of products, practically all of them are, in part at least, derived indirectly from the hemicellulosic portions of wood (*11*).

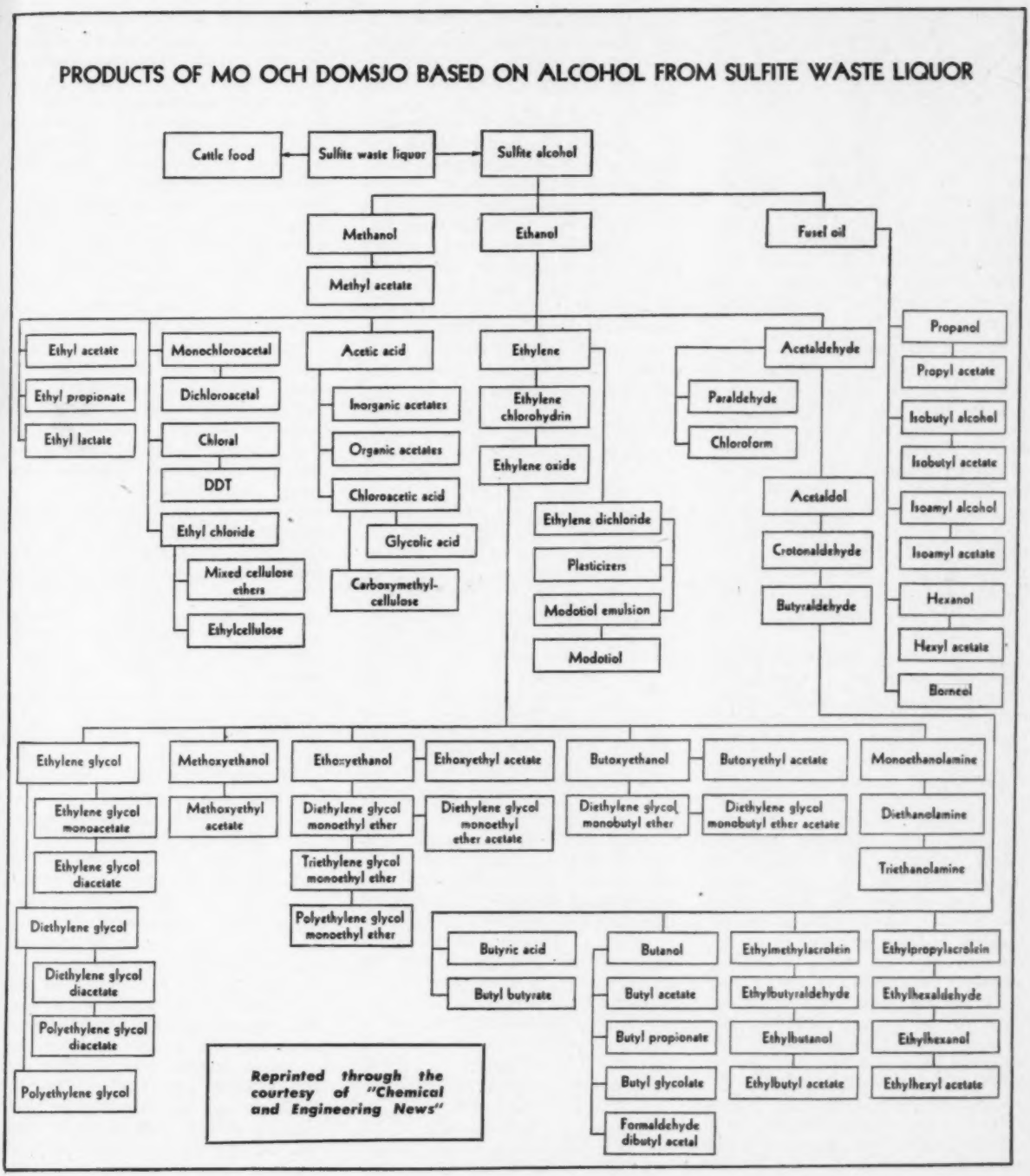
It is entirely conceivable that hemicelluloses of hardwoods can act as precursors for the sugar *xylose*, if this sugar ever finds a suitable market. Similarly these same hemicelluloses can be converted by acid into furfural (also formed from xylose). Inasmuch as the industrial production of furfural has recently been stimulated by its use in nylon manufacture (*12*), furfural production from wood becomes a future possibility. The fact that hardwood or straw hemicelluloses (xylan) could be converted in the laboratory into such products as glyceric aldehyde, glyceric acid, glycerol, and glycol (*13*) also presents interesting future possibilities.

It has been known for a long time that the hemicelluloses remaining in a chemical pulp have a marked influence on pulp properties and quality, but only in recent years have systematic studies in the field been made.

In 1933, Young and Rowland (*14*) showed that in *coniferous* pulps a correlation existed between hydration capacity and pentosan content. This relationship between swelling tendency (in contact with water) and percentage pentosans was found to be approximately linear, and the percentage swelling could usually be predicted within an error of less than 10 per cent. At one extreme, an alpha pulp with less than 2.5 per cent pentosans showed a swelling capacity of 42 percent; at the other extreme, a southern kraft pulp containing 12.6 per cent pentosans showed a 96 per cent increase in volume on swelling. However, the correlation between pentosan and swelling characteristics of *hardwood* soda pulps was far less satisfactory and the result showed scattering. The authors observed (with reservation) that the manner in which the pentosan material is combined in hardwood pulps was presumably different from that in softwoods. This lack of correlation is interesting because, on the basis of pentosan content alone, a hardwood pulp would be expected to show a far greater swelling capacity than would a softwood pulp. Recent work shows that Young and Rowland's conjecture was correct (*15*). Two pulps prepared from the same aspen wood, but formed by two very different methods contained nearly identical xylan contents. However, their pulp properties were very different. Thus it was shown that the aspen bleached kraft pulp which contained 18.1 per cent xylan showed a far lower burst and a somewhat lower tensile than did a modified "holocellulose" pulp containing 18.8 per cent xylan. The latter required 44 minutes to reach 500 degrees Schopper-Riegler, whereas the former required 95 minutes. The tear factor was much higher in the case of the kraft pulp.

Although the total xylans in the two pulps was nearly the same, the total *alkali extractable hemicelluloses* was very different. The bleached kraft pulp contained only 12.6 per cent, whereas the holocellulose pulp contained 29.9 per cent hemicelluloses. Furthermore, the alpha pulp from the kraft pulp retained 9.4 per cent xylan; the alpha-cellulose from the holocellulose pulp retained only 3.3 per cent xylan.

Another investigator, Dörr (*15a*), also has shown that the hemicellulose content of a pulp is not necessarily related to the total xylan content of such a fibrous residue. It is evident, then, that xylan content *per se* cannot be correlated with the pulp properties of an aspen pulp. The xylan firmly held in the cellulose fabric plays no important role in hydration. It is



the hemicellulosic xylan that is the main factor in improving pulp quality. Very recently Aronovsky, Rhodes, and Lathrop (*16*) called attention to the rapid hydration of pulps made from such agricultural residues as bagasse and wheat straw. This tendency appears to be correlated with a high pentosan content, and it is interesting to speculate as to how much of this is in the hemicelluloses and how much is fixed in the alpha-cellulose of the pulp. Needless to say, rapid hydration effects a marked power saving in the operation of the beater.

In the case of softwoods, another type of hemicellulose (besides the xylans) may play an important role.

In 1933, Jonas and Rieth (*17*) showed that two pulps that were very similar in their chemical properties *excepting for mannan content* showed markedly different strength properties. The pulp with the higher mannan content gave a far higher tensile and burst than did the other. Furthermore when each of these pulps was extracted with barium hydroxide, the tensile dropped very markedly in either case but most in the case of the pulp high in mannans. When 5 per cent of "wood gum" (a hemicellulosic mixture) was incorporated into the weaker pulp, its breaking length increased. In a third (relatively weak) pulp, the addition of 2.5 per cent "xylan" (based on the weight of the pulp) increased the original breaking length from 6075 m. to 6695 m. When 2.5 per cent

mannan (alone) was added to the pulp, the breaking length rose to 7050 m., and when a mixture of 2.5 per cent xylan and 2.5 per cent mannan was incorporated into the pulp the breaking length reached 7470 m. Unfortunately the authors do not give full details of the preparation of xylan nor do they describe the method of incorporation or the chemical properties of the third pulp. The fact remains, however, that both types of hemicelluloses serve to increase the tensile strength of the original pulp, and that mannan had the edge over the xylan.

Another important study should be cited. In 1936, Obermanns (*18*) showed that the addition of xylan (isolated from soda pulp and in paste form) to rag stock caused a marked drop in beating time, and an increase in folding endurance and in tear of the handsheet. As the pentosan content increased (to about 6.5 per cent), tear and folding endurance usually dropped. The tensile strength was also increased and linearly with increasing amounts of xylan (up to and including the pulp containing 6.5 per cent pentosans).

In certain cases, Obermanns added appreciable quantities of wood hemicelluloses to purified sulphite pulp. Here too, the beating time decreased rapidly, the Mullen, tensile, and folding endurance (at a freeness of 350 deg.) rose to a maximum and then fell with increasing amounts of added hemicellulose. In this case, the tear increased with increasing hemicellulosic content. The addition of hemicelluloses to an alpha wood pulp also increased the Mullen, tear and tensile. Aiken (*18a*) also noted that the addition of xylan raised the strength of rag stock. However, whenever the cellulose of the original stock, or the xylan, was acetylated prior to the beating operation, the strength of the paper decreased. This indicated that free hydroxyl groups in the xylan (or cellulose) were the groups active in bonding fibers to give a sheet of high tensile strength.

Recognition of the importance of the hemicelluloses to pulp and paper manufacture is not limited to the United States or Germany. Ya. G. Khinchin in the U.S.S.R. in 1939 and 1940 wrote two papers on the effects of xylans and mannans on the swelling properties of pulps. Only the abstracts of Khinchin's work are available in English, but his thought seems to be that the greater swelling properties of coniferous pulps (versus hardwood pulps) can be traced to their mannan content (*19*). Inasmuch, however, as a large part of the mannan of a coniferous pulp is actually in the alpha-cellulose fraction rather than in the alkali extractable hemicelluloses (*2*), the interesting hypothesis of Khinchin requires further substantiation.

In the United States an outstanding piece of work was done by Houtz and Kurth (*20*) on the papermaking properties of spruce holocellulose. Details of this investigation need not be given, but the following facts were made evident. Modified holocellulose preparations which retained the greater part of hemicelluloses, after processing in the laboratory beater, hydrated rapidly. Handsheets showed good fiber-to-fiber bonding and excellent strength properties. The bursting strength and folding endurance were high. In contrast to the holocellulose, an alpha-cellulose preparation from the same sample of holocellulose was extremely resistant to hydration on beating and developed poor strength properties. Bursting strength and folding endurance were low. The original holocellulose could be beaten to form a glassine stock. Evidently, the hemicelluloses had a marked effect on the formation of gelatinous hydrates in the beater, and the investigation showed that when highly hydrated stock was required, a high proportion of hemicelluloses must be retained in the pulp.

When in the United States, Ritter and his co-workers showed the possibility of preparing holocellulose, German investigators followed suit. In Darmstadt, Jayme and his students showed that spruce and beech holocellulose (prepared in modified form, but which still retained most of the hemicelluloses of the wood) had good papermaking properties and that sheets therefrom had excellent strength properties (*21*). However, in this study, many of the holocellulose pulps retained appreciable amounts of lignin; when the lignin content was low, hydration was rapid—a fact ascribed to high hemicellulose content. Breaking length and burst also were high in those pulps that were low in lignin (and high in hemicellulose).

More specific investigations on the relationship between paper strength and hemicellulose content were carried out by Jayme and Lochmüller-Kerler (*22*). Beechwood sulphite pulps were prepared under mild cooking conditions and then were bleached with chlorite. Depending on the initial digestion, the yields varied. It was shown that the highest overall strength properties were developed when the pulp yields were 50-52 per cent. This pulp contained 80.9 per cent alpha-cellulose, 1.09 per cent lignin, and about 18 per cent hemicelluloses (*i.e.*, material soluble in 17.5 per cent sodium hydroxide). An important finding was that *all individual strength properties were not necessarily within this yield range.* Maximum breaking length was found at a yield of 53 per cent; maximum elongation at 51.5 per cent; maximum folding endurance at 53 per cent, and maximum internal tear at 47 per cent yield. When the pulp yield *far exceeded* 52 per cent, a cautious removal of the hemicelluloses with 0.2 per cent sodium hydroxide caused *an increase in over-all strength.* When, however, the pulp yield fell much below 50 per cent, the over-all strength of pulp also decreased. These findings indicated that there may be a direct correlation between hemicellulose content and strength of the sheet. However, the picture is not quite as simple as that. The pulp of maximum strength still retained a small amount of lignin. This component, as Jahn and Holmberg have shown, affects pulp strength very adversely (*23*). *A priori,* it may seem doubtful that only 1 per cent of lignin would affect the strength very greatly. In a series of pulps prepared from white pine by partial delignification with chlorine dioxide, Holmberg and Jahn showed that the greatest strength was attained with a lignin content of 1.1 per cent. However, as these investigators did not obtain complete delignification, there is no absolute assurance that even this small lignin content might not be of some significance. Jayme and Lochmüller-Kerler's research on beechwood was repeated and confirmed in later work (*24*). Here again approximately a 50 per cent pulp yield resulted in the best over-all pulp quality numbers.

Klauditz (*25*) has also shown that under certain conditions a pulp may lose in over-all strength by containing too much hemicellulose. This was not the main objective of his work, but an interesting by-product. Starting with spruce chips, Klauditz made very mild sulphite cooks at 110 C. using varying cooking schedules and obtaining high yields. The raw pulps obtained in this way were then bleached with chlorite to remove lignin. A very raw pulp, obtained after digesting only 1.5 hours (yield 86.5 per cent), *when treated with chlorite* gave a pulp yield (based on the original wood) of 65.4 per cent. Its breaking length was 11,730 meters, and its folding endurance (Schopper fold tester) was 4810. When this pulp was extracted with 0.1 per cent sodium hydroxide, the yield dropped to 54.7 per cent, but the breaking length rose to 14,050 meters and the folding endurance increased to 6630. These unusual strength figures are of interest. They appear to be correlated with hemicellulose removal.

Jayme has written an important collective treatise on the utilization of the hemicelluloses (*13*). In this he gives a critical survey of methods used in the extraction and recovery of hemicelluloses from wood and their influence on pulp quality. Jayme focuses not only upon beechwood holocellulose (which besides pentosans still retained hemicellulosic hexosans), but also on experiments with spruce wood. An unbleached spruce sulphite pulp (I) was tested for its strength properties and then carefully bleached with chlorite. The pulp was then air dried (II) and also kept in the moist state (III). Both samples were then tested and compared in strength properties with (I). Weight/volume, elongation, burst, breaking length and internal tear were found to be highest in (III) and lowest in (I), (II) occupying a position intermediate between the two. This was also true for folding endurance at 65 deg. S. R. However, at 50 deg. S. R. the folding endurance of (II) was much greater than that of (I) and even slightly higher than that of (III). Jayme also showed that a Mitscherlich pulp (IV) when treated with 4 per cent sodium hydroxide lost 7.4 per cent hemicelluloses. The residual pulp then showed a marked loss in breaking length, internal tear and folding endurance. When, however, this pulp was thoroughly impregnated with a dilute alkaline solution of the isolated hemicelluloses followed by acetic acid treatment, and when 2.5 per cent of this material was retained by the fiber, the strength properties of the pulp increased markedly (approaching those of IV). Jayme, however, was unsuccessful in really improving the quality of an alkali extracted straw pulp by reintroducing the hemicelluloses in this fashion, and March (*15*) found that retreatment of an aspen pulp with *an alkaline solution* of hemicellulose followed by careful acidification did not improve the strength of the pre-extracted pulp. Jayme has made the generalization that bleached sulphite pulp when treated with aqueous alkali shows an increased alpha cellulose content, a decreased copper number, a decreased methoxyl content (which may be due to removal of methoxyuronic acid groups) and a general retrogression in physical properties.

Although space does not permit a comprehensive summary of their paper, at least reference should be given to an article by Jayme and Reh, on the effect of age of aspen on its chemical composition and suitability in pulp manufacture (*26*). When aspens of different ages were pulped by the kraft process, it became evident that strength properties could not be definitely correlated with age although the oldest tree (43 years of age) gave the weakest pulp. The wood of this tree had the highest lignin, and presumably the lowest hemicellulose content. Young hybrid poplars (*P. robusta, P. marylandica, P. serotina,* and *P. canadensis*) gave unusually high sulphate pulp yields and a remarkably high pulp strength. Young aspen wood 9-17 years of age (in contrast to young beechwood) is advocated in the production of strong kraft pulps, some of which approach the properties of those of coniferous woods.

March (*15*), working with lignin-free aspen holocellulose (which he had subjected to a stepwise extraction with aqueous alkali), showed that there was an optimum hemicellulose content, at which strength properties became manifest. When the residue from the fibrous residue still retained about 20 per cent hemicellulose, the bursting strength of the sheet passed through a maximum and opacity through a minimum. The tearing strength was at a minimum at 20-27 per cent hemicelluloses; the tensile strength (breaking length) showed a maximum within this same range.

Together with these more basic studies on the role of hemicelluloses in pulp quality, some discussion by practical papermakers has come to the fore. Among the older analytical methods in general use by TAPPI (and other technical associations) are those involving the determination of 'beta" and 'gamma" celluloses. Actually these two fractions are hemicellulosic in nature, with gamma-cellulose the more soluble of the two. In discussing paper strength, Cottrall (*27*) pointed out that there seemed to be a relationship between strength and gamma-cellulose content. Strong bleached pulp showed the highest gamma-cellulose values, which decreased down through the softer papermaking bleached pulps to the weak dissolving pulp. The latter also contained the least gamma-cellulose. Microscopic examination showed that resistance to shortening of fibers on beating under identical conditions was contingent on the amount of gamma-cellulose present. The most resistant pulps were the strong krafts high in gamma-cellulose whereas the most easily cut were the dissolving pulps low in this component. It is evident that the cutting capacity of a beater is not only a function of the mechanical conditions of operation, but is also influenced by the chemical character of the fiber. Hebbs (*28*), while not in complete agreement with Cottrall, supports the principle that maximum strength in papermaking is dependent more on the pulp than on papermaking factors. Although he admits the striking relationship between gamma-cellulose and the burst ratio, Hebbs points out that this correlation does not always obtain. For example, a raw pulp with a gamma content of 13.7 per cent had a burst factor of 70, whereas a well cooked pulp containing 6.7 per cent gamma-cellulose showed a burst of 78. Other examples, in which similar discrepancies exist, are cited. Greenane, on the other hand (*29*) showed that in two bleached kraft pulps (one strong, the other soft) and in two sulphite dissolving pulps, there was a correlation between gamma cellulose and the burst factor. Whenever, the alkali soluble fractions were removed, the residual pulps beat far less readily and showed lowered strength properties.

In these studies, both practical and fundamental, the results all point in the same direction. In chemical wood pulps the presence of hemicelluloses is a requisite to satisfactory pulp quality. Presumably, the optimum hemicellulose content will vary, depending on the nature of the wood and/or the condition of the cook. March's work shows how dangerous it is to draw conclusions simply on the basis of over-all pentosan determinations without probing more deeply into their distribution in the pulp. Orienting experiments (*30*) indicate that it is also true of the mannose-yielding polysaccharides in wood.

Whether or not the chemical configuration of hemicelluloses influences their effect on pulp quality is still a moot question. Presumably, their degree of polymerization is more important than is their chemical constitution, but as yet experimental data in this field are lacking.

Before leaving the hemicelluloses, the advantages of which have been stressed, one minor disadvantage should be mentioned. There is some evidence that the yellowing of bleached pulp may be ascribed (indirectly) to the hemicelluloses. Giertz (*31*) showed that the main cause of the yellowing (obtained in accelerated aging by heating, at 120 C. for 16 hours) is due to decomposition of carbohydrate products formed during the bleaching operations. Strong bleached sulphite pulps were the main offenders. Soft bleached sulphite pulps rarely showed yellowing. Bleached sulphate pulps were also free from this difficulty. If a strong sulphite pulp was fractionated, the portion which contained damaged short fibers and "mucilagenous material" retained the highest percentage of components that led to darkening. The removal of this frac-

(Turn to page 834)

The Scrubbing of Sulphate Recovery Furnace Stack Gases---Part II

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Thilmany Pulp & Paper Co.

A Pilot Plant Study of the Pease-Anthony Scrubber and the Venturi-Scrubber

▶▶▶ THE DATA TAKEN during these investigations and the calculations were quite extensive. In order to allow a clear understanding of the essential data and results of these studies, it is necessary to condense the material. Some trials were made using a 4-inch i.d. venturi throat together with the conventional Pease-Anthony Scrubber with efficiencies as high as 99 per cent removal of sodium salts from the gas. During the tests with the small throat, some of the spray nozzles in the P-A Scrubber were plugged (or partially so), and for that reason it was felt that the results would not be comparable with other runs. The high efficiencies obtained with the small venturi throat can be explained on the basis that there was a more uniform distribution of scrubbing liquor in the small throat than was subsequently obtained in a larger throat, and the gas velocity through the throat was comparatively higher.

Presentation of Data

The first series of trials was made with the conventional Pease-Anthony Scrubber operating at various gas rates on a hot, recirculated solution of fume or cold water. Due to mechanical difficulties, it was not possible to maintain the spray pressure at the desired value of 150 psi throughout the runs. The results of these trials are represented by the curves given in Figures 5 and 6.

The next series of trials was made for the purpose of determining the effect of the "diffusion process" in the removal of sulphate recovery furnace fume from the stack gases. A larger venturi throat (5⅜-in i.d.) than was originally tested was used for all the experiments described in this article where a Venturi Atomizer is called for. The liquid was injected into the throat through six standard ⅛-in. pipes located radially about the throat. The liquid fed into the venturi throat was adjusted by leaving all the nozzles on and throttling the feed so as to get an equal amount through each nozzle. A comparison was made between the use of the venturi alone and the venturi followed by the retention tank and the conventional Pease-Anthony Scrubber with the sprays operating at 150 or 60 psi pressure. This data is plotted in Figure 7.

In order to compare the factor of quality of spray versus quantity of spray in the P-A Scrubber when preceeded by a Venturi Atomizer, several tests were made in which only a portion of the high pressure sprays in the P-A Scrubber were used. The spray zone was kept the same by evenly spacing the nozzles on the same length of spray manifold and the amount of liquid injected into the venturi throat was kept at 3.5 to 3.6 gallons per 1,000 cu. ft. of inlet gas during these trials. The number of spray heads used in the P-A Scrubber for these tests were as follows:

Run	No. of Sprays	Spray Pressure (psi)
24 (0)	0	—
36 (1/3)	18	150
37 (2/3)	34	150
28 (3/3)	52	150
33	52	60

TABLE 1—Sodium and Sulphur Content of Sulphate Recovery Furnace Fume

Scrubber Test Sample	$\frac{\text{Sulphate S as } Na_2SO_4}{\text{Total Na as } Na_2SO_4}$	$\frac{\text{Total S as } Na_2SO_4}{\text{Total Na as } Na_2SO_4}$
5-A	0.326	0.450
5-B	0.396	0.507
6-A	0.266	0.416
6-B	0.333	0.353
7-A	0.295	0.480
7-B	0.411	0.515
Misc.	0.353	0.481
54-A	0.591	0.671
60-A	0.318	0.499
73-A	0.308	0.345
Averages	0.360	0.473

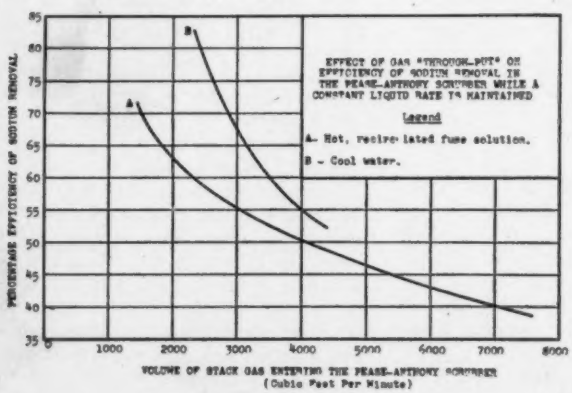

EFFECT OF GAS "THROUGH-PUT" ON EFFICIENCY OF SODIUM REMOVAL IN THE PEASE-ANTHONY SCRUBBER WHILE A CONSTANT LIQUID RATE IS MAINTAINED
Legend
A- Hot, recirculated fume solution.
B - Cool water.
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
VOLUME OF STACK GAS ENTERING THE PEASE-ANTHONY SCRUBBER (Cubic Feet Per Minute)

Figure 5

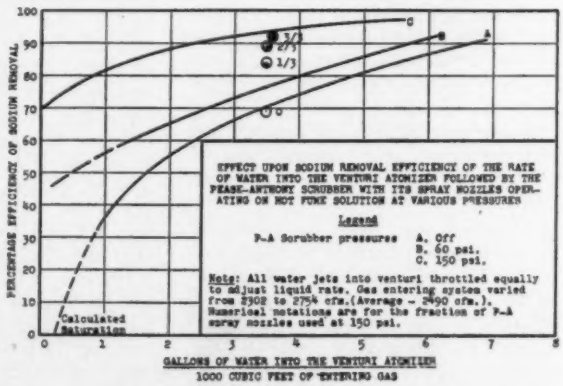

EFFECT UPON SODIUM REMOVAL EFFICIENCY OF THE RATE OF WATER INTO THE VENTURI ATOMIZER FOLLOWED BY THE PEASE-ANTHONY SCRUBBER WITH ITS SPRAY NOZZLES OPERATING ON HOT FUME SOLUTION AT VARIOUS PRESSURES
Legend
P-A Scrubber pressures A. Off
B. 60 psi.
C. 150 psi.
Note: All water jets into venturi throttled equally to adjust liquid rate. Gas entering system varied from 2302 to 2754 cfm.(Average - 2490 cfm.). Numerical notations are for the fraction of P-A spray nozzles used at 150 psi.
Calculated Saturation
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
GALLONS OF WATER INTO THE VENTURI ATOMIZER
1000 CUBIC FEET OF ENTERING GAS

Figure 7

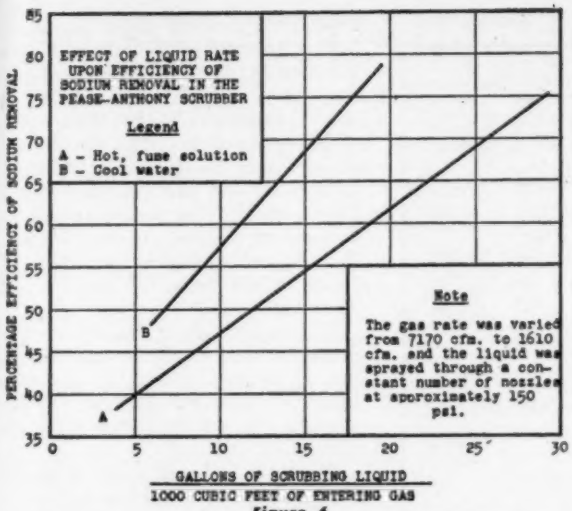

EFFECT OF LIQUID RATE UPON EFFICIENCY OF SODIUM REMOVAL IN THE PEASE-ANTHONY SCRUBBER
Legend
A - Hot, fume solution
B - Cool water
Note
The gas rate was varied from 7170 cfm. to 1610 cfm. and the liquid was sprayed through a constant number of nozzles at approximately 150 psi.
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
GALLONS OF SCRUBBING LIQUID
1000 CUBIC FEET OF ENTERING GAS

Figure 6

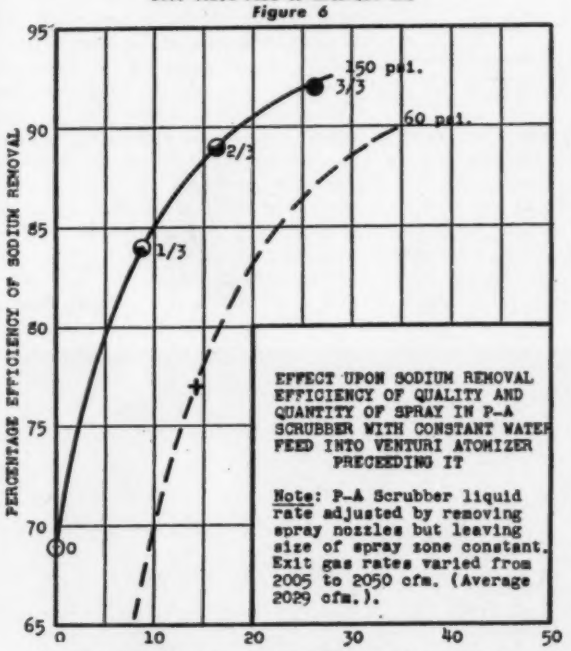

EFFECT UPON SODIUM REMOVAL EFFICIENCY OF QUALITY AND QUANTITY OF SPRAY IN P-A SCRUBBER WITH CONSTANT WATER FEED INTO VENTURI ATOMIZER PRECEEDING IT
Note: P-A Scrubber liquid rate adjusted by removing spray nozzles but leaving size of spray zone constant. Exit gas rates varied from 2005 to 2050 cfm. (Average 2029 cfm.).
150 psi.
60 psi.
3/3
2/3
1/3
0
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
GALLONS OF SOLUTION SPRAYED IN P-A SCRUBBER
1000 CUBIC FEET OF EXIT GAS

Figure 8

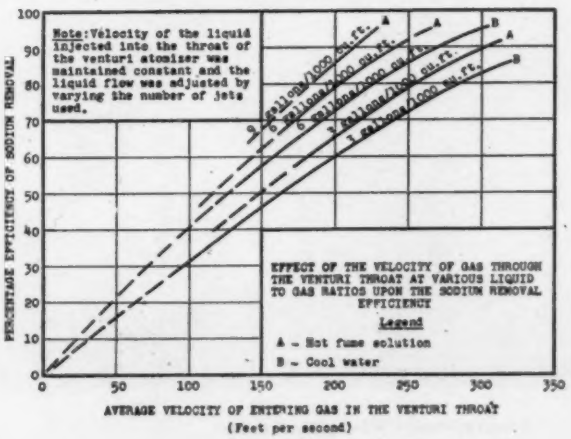

Note: Velocity of the liquid injected into the throat of the venturi atomizer was maintained constant and the liquid flow was adjusted by varying the number of jets used.
EFFECT OF THE VELOCITY OF GAS THROUGH THE VENTURI THROAT AT VARIOUS LIQUID TO GAS RATIOS UPON THE SODIUM REMOVAL EFFICIENCY
Legend
A - Hot fume solution
B - Cool water
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
AVERAGE VELOCITY OF ENTERING GAS IN THE VENTURI THROAT
(Feet per second)

Figure 10

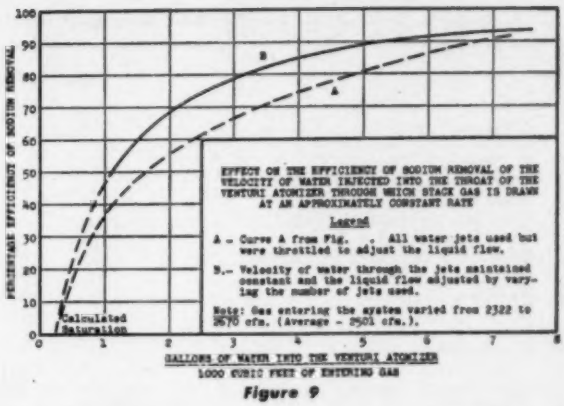

EFFECT ON THE EFFICIENCY OF SODIUM REMOVAL OF THE VELOCITY OF WATER INJECTED INTO THE THROAT OF THE VENTURI ATOMIZER THROUGH WHICH STACK GAS IS DRAWN AT AN APPROXIMATELY CONSTANT RATE
Legend
A - Curve A from Fig. . All water jets used but were throttled to adjust the liquid flow.
B - Velocity of water through the jets maintained constant and the liquid flow adjusted by varying the number of jets used.
Note: Gas entering the system varied from 2322 to 2670 cfm. (Average - 2501 cfm.).
Calculated Saturation
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
GALLONS OF WATER INTO THE VENTURI ATOMIZER
1000 CUBIC FEET OF ENTERING GAS

Figure 9

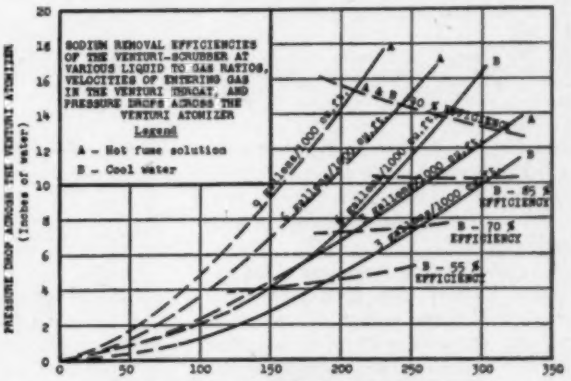

SODIUM REMOVAL EFFICIENCIES OF THE VENTURI-SCRUBBER AT VARIOUS LIQUID TO GAS RATIOS, VELOCITIES OF ENTERING GAS IN THE VENTURI THROAT, AND PRESSURE DROPS ACROSS THE VENTURI ATOMIZER
Legend
A - Hot fume solution
B - Cool water
B - 85 % EFFICIENCY
B - 70 % EFFICIENCY
B - 55 % EFFICIENCY
PRESSURE DROP ACROSS THE VENTURI ATOMIZER (Inches of water)
AVERAGE VELOCITY OF ENTERING GAS IN THE VENTURI THROAT
(Feet per second)

Figure 11

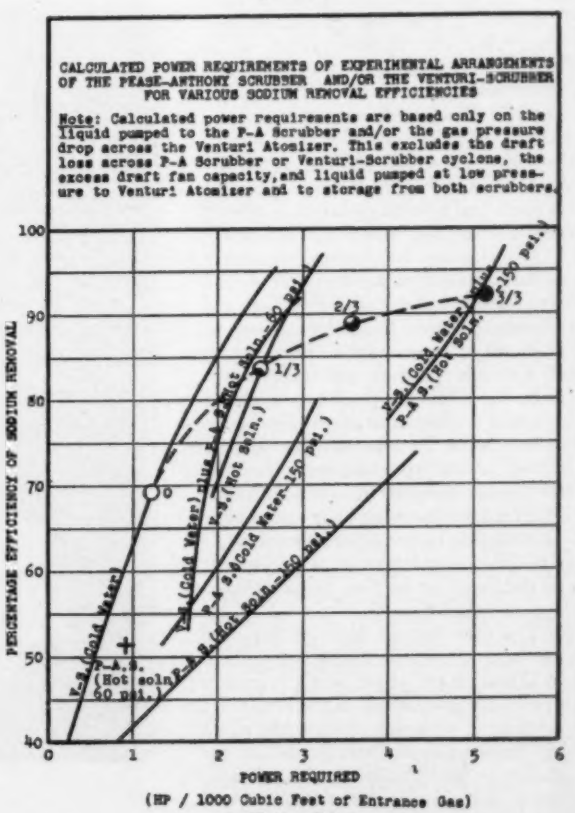

CALCULATED POWER REQUIREMENTS OF EXPERIMENTAL ARRANGEMENTS OF THE PEASE-ANTHONY SCRUBBER AND/OR THE VENTURI-SCRUBBER FOR VARIOUS SODIUM REMOVAL EFFICIENCIES
Note: Calculated power requirements are based only on the liquid pumped to the P-A Scrubber and/or the gas pressure drop across the Venturi Atomizer. This excludes the draft loss across P-A Scrubber or Venturi-Scrubber cyclone, the excess draft fan capacity, and liquid pumped at low pressure to Venturi Atomizer and to storage from both scrubbers.
P-A S. (Cold Water)
P-A S. (Hot soln. 60 psi.)
P-A S. (Cold Water) plus P-A S. (Hot soln. 60 psi.)
P-A S. (Hot soln. 60 psi.)
P-A S. (Cold Water-150 psi.)
P-A S. (Hot soln. 150 psi.)
P-A S. (Cold Water 150 psi.) plus P-A S. (Hot soln. 150 psi.)
2/3
1/3
3/3
0
PERCENTAGE EFFICIENCY OF SODIUM REMOVAL
POWER REQUIRED
(HP / 1000 Cubic Feet of Entrance Gas)

Figure 12

TABLE 2

Sample	Grains Per Cubic Foot of Gas at Stack Conditions			
	54-A		60-A	
A. Sample of Fume—				
Total Sodium as Na	0.616		0.609	
Total sulphur as S	0.288		0.212	
Total Na calculated to Na_2SO_4	1.900		1.880	
Total S calculated to Na_2SO_4	1.276		0.940	
Sulphate S calculated to Na_2SO_4		1.112		0.598
$Na_2S_2O_3$		0.009		0.014
Na_2SO_3		0.006		0.008
Excess of total sulphur as S		0.030		0.069
Sodium not combined with sulphur as Na	0.248		0.408	
Uncombined sodium* calculated to Na_2CO_3		0.571		0.943
Uncombined sodium calculated to $NaHCO_3$	0.905		1.490	
B. Sulphur-containing gases—				
SO_2		0.060		0.012
H_2S**		0.359		0.425
Sulphur in gases calculated to Na_2SO_4	1.628		1.797	
Total sulphur in fume and gases calculated to Na_2SO_4	2.904		2.737	

(*) NaCl in sample not detectable. (**) Mercaptan is measured and calculated as H_2S.

The data for these tests are plotted in Figure 8.

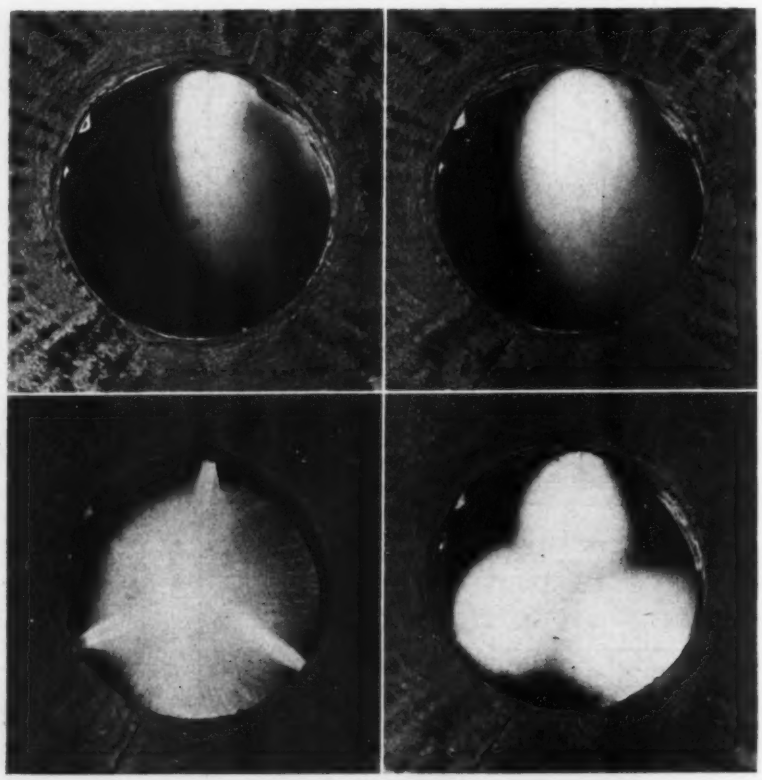
As the Venturi Atomizer alone appeared to have very good possibilities as a scrubber and as high efficiencies of sodium removal were obtained with it, it was decided to abandon further work in connection with the Pease-Anthony Scrubber. By this time it was also apparent that the delay time is unnecessary for the removal of sulphate recovery furnace fume by a Venturi Atomizer so the retention tower was removed from the system and the Venturi Atomizer was connected directly onto the P-A Scrubber inlet. The shell of the P-A Scrubber was then used merely as a dry cyclone for removing the entrainment produced in the Venturi Atomizer.

When using the Venturi Atomizer followed by a dry cyclone as the scrubbing combination, called the Venturi-Scrubber, several variables appear to be of major importance. The velocity of the gas through the throat, the ratio of liquid injected to entering gas, and temperature of the liquid together with its distribution in the throat as the gas atomizes it are the four most important considerations. The temperature of the scrubbing liquid seems to be of more importance than the concentration of chemicals in the liquid as long as the solution is not saturated.

The data for the Venturi-Scrubber has been plotted in several ways so as to illustrate the effect of the variables previously mentioned on the scrubbing efficiency. In order to show the effect of distribution of the liquid in the throat on the efficiency of scrubbing, curve B in Figure 9 has been plotted for comparison with Curve A of Figure 7. Curve A represents test runs in which all the liquor nozzles on the Venturi Atomizer were throttled equally to adjust the liquid rate whereas Curve B is based on tests made by keeping the liquid flow constant through each nozzle and reducing the number of nozzles used. The result of this was that the higher liquid injection velocity in the case of Curve B caused the liquid to shoot more out into the center of the throat. It is clearly demonstrated by these tests, all at entrance gas velocities within the optimum range and at approximately constant exit gas rates, that a higher efficiency of scrubbing can be attained by a more uniform distribution of an equivalent quantity of liquor in the throat of the Venturi Atomizer.

The importance of the other three major variables of the Venturi-Scrubber, liquor rate relative to gas rate, liquid temperature, and gas velocity through the throat is shown by the curves in Figure 10.

Not only is the efficiency of scrubbing attained of importance, but the power requirements for any given efficiency determine the economic feasibility of operation of the Venturi-Scrubber. As, in the case of the Venturi-Scrubber, practically all the power consumed is applied to the fan, the pressure drop across the Venturi Atomizer necessary to reach certain efficiencies with a sufficient quantity of scrubbing liquid must be considered before the pilot plant design can be projected to full scale. The pressure drops across the Venturi Atom-



Above—Figure 13 (L), Figure 14
Below—Figure 15 (L), Figure 16

TABLE 3—Data Corresponding to the Photographs of the Liquid Atomization in the Throat of the Venturi Atomizer

Fig.	Volume of Entering Air (cfm)	Water Volume (gpm)	Pressure Drop Across Venturi (in. w.g.)	Air Velocity (ft./sec.)	Water Velocity in Nozzles (ft./sec.)	Air Weight (lb./sec.)	Water Weight (lb./sec.)	Ratio (lb. Air / lb. Water)	Momentum of Air (ft.lb./sec.²)	Gal. of Liquid/ 1000 cu.ft. Air
13	3920	1.26	13.9	415	7.0	4.70	0.175	26.8	1,950	0.32
14	3440	3.09	15.8	364	17.3	4.13	0.429	9.6	1,500	0.90
15	870	9.27	2.5	92	17.3	1.04	1.29	0.81	96	10.7
16	2382	9.27	11.5	252	17.3	2.86	1.29	2.22	722	3.89
17	3120	9.27	16.8	330	17.3	3.74	1.29	2.90	1,233	2.97
18	2200	18.5	19.3	233	17.3	2.64	2.58	1.02	616	8.43
19	1760	....	19.5	193	....	2.11	....	....	407	....
20	1558	....	19.8	171	....	1.87	....	....	320	....

izer for various temperatures, ratios of liquid to gas, and velocities of gas through the throat together with lines of approximate constant efficiency are given in Figure 11. In considering all these curves, it must be kept in mind that they are an ideal picturization of the available data (represented by the solid portions) and estimates (represented by the dotted lines) as to where further test data might fall.

In addition to the technical data, it is of interest to have some idea of the power requirements of the various scrubber combinations. In making these calculations, several assumptions were made so that the data would be comparative between the various combinations.

1) The comparative power requirements of the conventional Pease-Anthony Scrubber were based on the power required to pump the liquor at high pressure to the spray manifold.

2) The power required for the Venturi-Scrubber was calculated from the pressure drop across the Venturi Atomizer.

3) The "increase in diameter" factor of the Pease-Anthony Scrubber was not considered in these calculations but will be discussed later.

4) The power consumption by a suitable fan necessary to handle the pressure drop across the P-A Scrubber or the dry cyclone after the Venturi-Scrubber together with the loss through the fan was not considered in the two cases as it was approximately equal for each unit of the pilot plant.

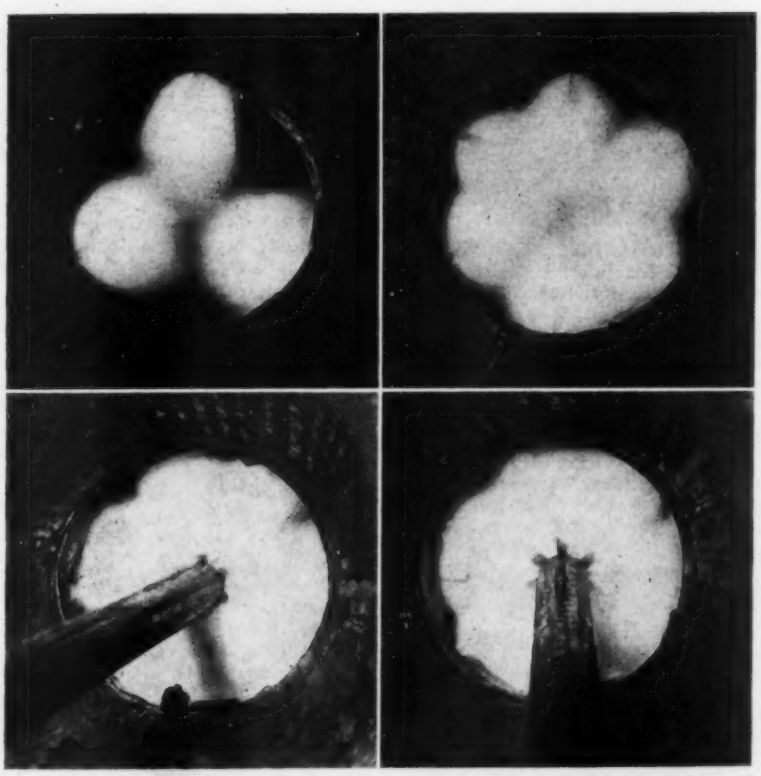
5) The calculated power requirement for the low pressure liquor pumps used on the scrubbers is approximately equal in the two cases and is small compared to the power required for the high pressure sprays of the P-A Scrubber or the fan on the Venturi-Scrubber.

It should be kept in mind that for low efficiency operation, the auxiliary power requirements almost constant, would represent a larger percentage of the total power required than for high efficiency.

The calculated horsepower data is given in Figure 12, and it has been estimated that 90 per cent efficiency of salt cake recovery for a large scale Venturi scrubber unit will require approximately 43 kw.-hr./ton of pulp.

In order to determine the relative proportion of sodium sulphate to sodium carbonate in the recovery furnace fume, several samples taken for sodium removal efficiencies were analyzed for sodium, sulphate sulphur, and total sulphur. The sulphur and sodium compounds of the fume caught in the sampling apparatus were considered as being in the same ratio as they would appear in the scrubbing liquid. The results of these analyses are given in Table 1. The *p*H of the same solution can also be said to be comparable to that of the scrubber solution. For example, the *p*H of sample 73-A was 8.8 and sample 2-B was 7.2. (*A* means ahead of scrubber, and *B* means behind scrubber.)

A more complete analysis of the sulphur and sodium compounds in the stack gas was found necessary in order to allow an understanding of the loss of sulphur in gaseous form compared to the fume (or solid) loss. Table 2



Above—Figure 17 (L), Figure 18
Below—Figure 19 (L), Figure 20

Note: In Figure 19 is shown the liquid sprayed from a central pipe through 6 radial holes. Figure 20 shows the combination of regular liquid feed nozzles in the wall of the throat together with the central pipe. No trial runs were ever made using the central feed pipe.

gives a complete analysis of both the sodium and sulphur compounds caught prior to and in the fume catcher portion of the sampling apparatus together with an analysis of the sulphur-containing gases which pass through the fume catcher (and presumably the scrubber).

Analytical data for the samples of fume taken before the scrubbers showed that the average salt cake concentration (calculated from the sodium content) in the dust was 2 grains per cu. ft. of gas at inlet conditions.

Pitot tube traverses of the main stack duct showed that for 140 tons of daily pulp production the furnace gases, after passing through a disc evaporator and an induced draft fan, have a volume of 40,000 to 50,000 cfm (average 45,000 cfm) at 300 Fahr. (dry bulb), 164 Fahr. (wet bulb), and an absolute pressure of 29.3 inches of mercury. These would be the entrance conditions of the gas for a full-scale Venturi-Scrubber to be installed in connection with this recovery furnace. Based on this data, the stack loss is 140 pounds of sodium sulphate per ton of pulp, calculated from the sodium content of the inlet gases in the pilot plant tests. It should be pointed out that this value of dust loading in the inlet gas may be high because of the velocity of gas entering the scrubber intake dust was much lower than the velocity of the gas in the main duct.

After the conclusion of the testing of the Venturi-Scrubber it was decided to observe the action of the liquor in the venturi throat while drawing air through it. The purpose of this was to help in later designing an arrangement for giving a more uniform distribution of liquid in the throat so that a lower velocity of gas entering the Venturi Atomizer (and also pressure drop across the venturi throat) would be required to atomize a given quantity of liquid and to give a higher corresponding efficiency of sodium removal from the stack gases.

Photographs were taken from a point only a short distance ahead of where the venturi begins to converge to form the throat. Air was being pulled through the Venturi Atomizer and cold water was injected into the gas stream. Views of the liquid being atomized in the venturi throat under various conditions are shown in Figures 13 to 20, and the corresponding data are given in Table 3.

Part I of Mr. Collins' article was published in the August issue of this magazine. Another installment will appear next month. Complete bibliography appeared with Part I.

Correction

In Part 1 of this article, which appeared in the August issue, final printers corrections resulted in the omission of two minus signs from the equation which appeared at the top of page 685. The correct equation is presented herewith:

$$\text{Moles } SO_2 = \frac{(\text{Ml. NaOH})\ (\text{Norm. NaOH})}{2000} - \frac{(\text{Ml. } I_2 \text{ used})\ (\text{Norm. } I_2)}{2000}$$

$$\text{Moles } H_2S = \frac{2(\text{Ml. } I_2 \text{ used})\ (\text{Norm. } I_2)}{2000} - \frac{(\text{Ml. NaOH})\ (\text{Norm. NaOH})}{2000}$$

Hemicelluloses . . .

(Continued from page 829)

tion improved the pulp. To a certain extent alkaline treatment also removed the degradation products (formed during the bleach). Water alone did not cause their removal. Acidification, after bleaching, exaggerated the tendency towards darkening. Chlorine dioxide (which prevents polysaccharide degradation) could be applied without subsequent yellowing.

In general, however, it may be said that the hemicelluloses, when present in reasonable amounts have a beneficial effect on pulp strength. The optimum amount of hemicellulose will vary, depending on the nature of the fibrous raw material used. Future investigation presumably will furnish us with more qualitative and quantitative data in this regard.

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The New Labor Bill and how It Will Work ---53 Questions Answered

▶▶▶ THE QUIZ OF QUIZZES in the volatile field of labor relations is: "How Will the New Labor Law Operate in Practice?" The answer is not contained in any simple, easy-to-digest capsule. Neither are the new regulations so complicated or obscure as to discourage the employer from digging into the new provisions and coming up with the real know-how on what he should do when negotiating with labor under the revised rules.

The following, in question and answer form, will provide the ABCs of the Taft-Hartley law, free from the overdose of legalisms which makes the Act itself so formidable a document.

Q.—I have a closed shop agreement in my current contract. Is it illegal from now on?

A.—No. Your present contract is valid until it expires.

Q.—What about a union shop which requires employees to join up after a 30-day trial period?

A.—The new law says that you cannot sign a union security provision into your contract unless a majority of the eligible employees in the bargaining unit have voted to authorize the union to negotiate such a provision.

Q.—What do you mean "a majority of the employees in the unit"?

A.—Just that. It must be a majority of the employees eligible to vote in the unit, not a majority of those who turn up at the ballot box.

Example—You have 200 workers in the bargaining unit and only 50 turn up to vote. Even if all of these vote "yes" on union security, the union loses.

Q.—Does that mean that if the union loses, I can operate an open shop?

A.—Yes, that's right.

Q.—Will I, the employer, have to pay my workers for the voting time?

A.—No, but you may, if you care to do so.

Q.—Will the vote on the union shop be taken before or after actual negotiations begin?

A.—Before, because the union will not be able to demand such a clause unless it has ballot box proof that the employees want union security.

THE LABOR RELATIONS STAFF of the Collective Bargaining Bulletin*

Q.—Does that mean that once the employees have voted for union security, I have to accept it?

A.—Not at all. All it means is that you can negotiate the issue.

Q.—Who will be eligible to vote on the union shop issue?

A.—A good question! All the employees in the bargaining unit will be permitted to cast their ballot—even those who in a certification election previously, voted "no union."

Q.—Must a vote on union security be taken every time my contract comes up for renewal?

A.—No. The union security clause can continue in renewal unless at least 30 per cent of the employees petition the NLRB that they want "out."

Q.—Once I have signed a union shop agreement, does that mean that I have to fire an employee if he loses his "good standing" with the union?

A.—No it does not, and here the law is very specific. It provides that you must fire a worker on union demand ONLY if he fails to pay his dues or initiation fee, and for no other reason.

Q.—What if a worker gets involved in union politics and is thrown out of the union. Do I have to fire him then?

A.—No. It would be an unfair labor practice on your part to do so. He can only be discharged for nonpayment of dues or initiation fee. Whatever happens to him inside the union has no bearing on his employment with you.

Q.—Is there any way in which I can make sure that nonpayment of dues is the real reason for the union's demand that he be discharged?

A.—Yes. If you have a checkoff, then you can easily tell if the worker is delinquent.

In view of this new turn of events, many employers will prefer to have a checkoff so that they could always be sure from their own records that the union's demand for discharge is legitimate. Remember—if you wrongly fire a worker on union "say-so," he may file an unfair labor practice charge against you, and the NLRB may hold you liable for reinstatement, with back pay.

Q.—Is the checkoff still permissible?

A.—Yes it is, but only where the employee has given you in writing, a voluntary authorization to deduct regular union dues from his pay envelope.

Q.—Can my employees revoke this authorization "at heart's content?"

A.—No. The authorization is good for at least one year or when the contract between you and union expires—whichever is first.

Q.—Can the checkoff include anything else in addition to regular union dues?

A.—Yes, it can include the initiation fee. No special assessments, contributions to union funds, or other levies are permitted to be checked off by the company for the union.

Q.—Can I balk at a checkoff or initiation fee if I think it is too high?

A.—If you feel that the dues are too high or the initiation fee is too large, you can file an unfair labor practice charge against the union. The NLRB will then investigate and make the appropriate decision. The employee too, can ask the NLRB to size up the union's dues and initiation fees.

Q.—Once I have agreed to a checkoff, can the union boost the "ante" and demand that I turn over the larger amount?

A.—Don't do it. Check off only the amounts stipulated when the contract is signed. All dues increases are the union's own business and let it handle that end of it the best it can.

Q.—I have always negotiated through an employer's association. Under the new law do I have to continue that arrangement? Can the union force me to accept the settlement it reaches with the association?

A.—No. An employer can, if he wishes, disassociate himself from the employer's group and negotiate on his own. The employer may, however, continue to negotiate on an industry-wide basis. There is no compulsion one way or the other.

Q.—When do I start negotiating on a new contract?

(*) An affiliate of the 30-year old National Foremen's Institute, which provides businessmen with techniques on collective bargaining and labor relations.

A.—At least 60 days before your contract is due to expire. You must notify the union that you want to either renew or modify your agreement.

Q.—Must I initiate this action?

A.—No, the union can do likewise.

Q.—What then?

A.—You and the union must start negotiations. Within thirty days if no agreement has been reached, the new Federal Mediation Service and your state Mediation Board must be notified that a dispute exists.

Q.—What follows?

A.—You continue negotiations. The union is not permitted to call a strike for sixty days after the Mediation Service has been notified of the dispute. In other words, a status quo.

Once the Mediation Service has been notified, it may step in and offer a formula for settlement. Neither you nor the union need accept its solution.

Q.—How long must the union wait until it can legally strike?

A.—It cannot legally strike until sixty days have elapsed between the date of notification to the Mediation Service and the day of the walkout. In other words, there may be as much as a 90-day lapse.

NOTE—This figure will not always work out to a 90-day cooling-off period. Here's why: The unions will, in practice, notify the Mediation Service that a dispute exists just as soon as it receives notification from you that you want to modify your agreement. This takes place sixty days before actual expiration. Instead of waiting for thirty days of negotiations to elapse, the union will maintain that a dispute exists by the very fact of your notification to it. It will so inform the Mediation Service in order to be in a position to strike sixty days later—or at the expiration of the contract.

Q.—What if the union calls a strike before the 60-day cooling-off period?

A.—By doing so the union will jeopardize the jobs of the workers. The new law provides that employees who violate the "no strike" regulations will lose their protection under the Act and can be replaced by the employer.

Q.—Does the employer have to take them back if the union calls off the walkout or decides to come to terms?

A.—Not if the strike was in violation of the new Act. But he may take them back if he wishes.

Q.—If the union waits sixty days and then goes out on strike, can I refuse to rehire the strikers after it's all over?

A.—In an economic strike such as this, you must not discriminate against workers because they went out on strike. If they have not been replaced and there is work, you must rehire them.

Q.—Suppose at the expiration of my contract I feel that the union no longer has a majority status among my employees?

A.—A very pertinent question, for the "decertification" aspects of the new law are likely to be among the most hotly contested provisions of the entire Act.

If you feel that the union no longer represents a majority, you can petition the NLRB to look into the matter. You can do so even if there is only one union involved. Previously, the employer had to keep "mum" about decertification unless there were at least two unions fighting it out for representation. Now you can take the initiative and question the union's popularity when the contract comes up for renewal.

This procedure calls for caution. What will happen in practice—the union will immediately file a charge of "refusal to bargain" which is an unfair labor practice. The union may even go out on strike. If the NLRB subsequently finds that there was no basis for your decertification move, then it may hit you with an unfair labor practice which would automatically make the strike "legal" and the employees entitled to reinstatement with back pay.

Q. — Can the employees themselves petition the NLRB to make a check of the union majority status?

A.—They sure can, provided a reasonable (30-35 per cent) request it.

This is the safer procedure. If the union goes out on strike because some employees have petitioned the Board, then the employer cannot possibly be held guilty of an unfair labor practice. The walkout then becomes an economic one and the workers who participate are on their own and can be replaced—and even if taken back by the employer, are not entitled to back pay. Also, while out on strike, the workers cannot take part in any decertification election.

Q.—If I feel that the union doesn't represent a majority, can I go ahead and make my view known to my employees?

A.—The new law has greatly expanded the employer's right of free speech. The regulations specifically state that: "The expressing of any views, arguments or opinion, or the dissemination thereof, whether in written, printed, graphic or visual form, shall not constitute or be evidence of an unfair labor practice under any of the provisions of this Act if such expression contains no threat of reprisal or force or promise of benefit."

Q.—If an election is held and the union is defeated, how soon after that can the union demand another election?

A.—Not before a year has elapsed.

Q.—What if another union makes a bid for recognition on the heels of the defeat of the previous labor outfit?

A.—It too will have to wait for one year.

Q.—What if a rival union claims jurisdiction while I have a contract with another union?

A.—The Board won't order an election until expiration time.

Q.—What if my employees are out on strike and the NLRB directs an election to determine the bargaining agent?

A. — It all depends on whether the strike has been called for economic reasons such as wages, hours, working conditions, or because of an unfair labor practice on your part.

NOTE: Under the new setup, economic strikers are not permitted to vote, but employees out on strike over an unfair labor practice charge are still eligible.

The employer will have to be very careful to avoid giving the union any basis for an unfair labor practice charge. From now on "economic" strikes as such, will be very few indeed. Unions will probably call every strike an "unfair labor practice strike" and let the NLRB make the final determination.

NOTE—Under the new Act, however, it is not as easy to prove unfair labor practices as it was under the standards of the Wagner Act. Evidence of unfair labor practices must be more than "substantial."

This will cut two ways — it will be equally difficult for employers to make unfair labor practices against unions stick.

Q. — What's this business of craft unions in the new Act?

A.—A very important part of the law, and you should know how it works. Any group of workers in a single skill (machinist, tool and die makers, etc.) can break away from the production units and be represented by a separate unit.

Q.—How can they do that?

A.—A number of them can petition the NLRB that they want a separate unit. The NLRB will then conduct a vote and ask the men whether they want their own unit, or they want to continue to team up with the production workers.

Q.—Does this mean that instead of negotiating with one union as I do now, I may have to deal with several?

A.—That's right. This section in the new law will be a boon to many A. F. of L. unions. A considerable amount of raiding will develop as the craft unions begin to demand representation for small groups in your plant.

Watch this section carefully for its effect on your seniority setup. If you have plant-wide seniority, you may have to

change it to occupational or departmental seniority because if craft men break into separate units, they will want separate seniority setups.

Q.—Do all crafts have to be broken up into separate units?

A.—Not at all. You can go along as you have with the production workers' union representing the whole shop. Only if the men in the craft branches begin to "beef" and take direct action—or another union claims jurisdiction—does the issue come up.

Q. — Does the same thing hold for plant guards?

A. — No. It is forbidden for plant guards to belong to any union which houses any other workers. They must belong to a different union—one which represents only plant guards.

Look for the rise of a series of independent unions of plant guards. For the first few years organizing activity among this group may be hectic as various outfits vie for plant guard loyalty.

Q.—How's the foreman situation to shape up under the new law?

A.—Foremen take on the strictly managerial hue from now on. They are *not* covered by the Act.

Q.—Does this mean that I can ask all my foremen to quit the union as a condition of employment?

A.—It does.

Q.—In selecting new foremen can I tell them that they are not to join any union?

A.—You can.

Q.—Can I fire a foreman for joining a union?

A.—Yes.

Q.—What if I wish to maintain the status quo and let my foremen belong to the production workers' union as they do now?

A.—You can continue that practice if you wish. Many employers, as in the printing trades, will not upset that type of arrangement.

Q.—The union is down on one of my foremen for being outspoken against the union in the plant. What can the labor organization do about that?

A.—As long as your foremen are not guilty of discriminating against workers or using threats, they are as free to express their views as you are.

Q.—My workers have not left their jobs but they are refusing to work on raw materials made by a company in our area whose workers are on strike. What can I do about it?

A.—This is for all practical purposes a sympathy strike or boycott, and illegal under the new law. You can file an unfair labor practice charge with the NLRB and such cases will be given priority by the Board.

Q.—How about welfare funds?

A.—The new law puts stern restrictions on this type of employee benefits. The welfare fund can no longer be administered by the union alone. There must be joint administration, and the fund cannot be used for any other purpose than pensions, health, etc. The monies cannot be used by the unions for strike benefits, organizational drives, etc.

Q.—What about suing a union?

A.—If the union commits an unfair labor practice such as forcing you to fire a worker for other than nonpayment of dues, you can sue in court for damages sustained by you. Or if the union conducts a boycott and you lose money, you can try to retrieve your losses through litigation.

NOTE—Technically, under most state laws, you always could sue a union. In practice this provision will be used little because the litigation involved will be costly and long.

Q.—If an employer is just being organized — can he recognize the union without demanding that it seek certification from the NLRB.

A.—Yes, but don't do it. Always ask the union to be certified and the law gives the employer plenty of permission to make that demand.

Q.—Under the new rules, unions now have to file a raft of information with the Department of Labor about their financial status, by-laws, communist affiliation, etc. Will that information be available to employers?

A.—That question is still unanswered. The chances are that the "dope" given by unions to the Government will be classified as confidential. Later rulings may provide that details about your union's way of life may be revealed under specific circumstances.

Some Heat Balance Considerations

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▶▶▶ A HEAT BALANCE study in an old plant begins with a survey. If the plant lacks proper records, it is necessary to obtain the following data: total electrical demands, total process steam demands, total heating load, and both hourly and seasonal variations in steam and electrical loads.

Every piece of equipment using steam must be scrutinized. The boiler plant and the power generating equipment, in particular, must be studied to see if any improvements can be made.

One factor, often overlooked as an index to industrial power plant performance, is the over-all thermal efficiency of the plant. All too often combustion efficiency is the only factor given consideration.

The use of a heat balance diagram is recognized as the most satisfactory method available of ascertaining the economy of an existing industrial plant. Really, it is surprising to see from a study of such a diagram how much heat is wasted either up the stack or down the sewer.

The computation of a heat balance, preparatory to the design of a new plant, is one of the most difficult jobs of a designing engineer. Once established it affects so many other elements in the plant that changes later on are difficult to effect.

In the design of a modern plant every effort should be made to obtain highest possible thermal efficiency. It is done by incorporating a high degree of flexibility in the heat balance in order to meet the varying load conditions always so prevalent in an industrial plant. A heat balance diagram would indicate whether a straight back-pressure turbine or a bleeder type bleeding at one or several pressures should be considered.

The heat balance would help in the determination and selection of the most economical pressures for both the turbine throttle and process steam. It also would indicate the stages of feedwater heating and pumps as the thermal gains must be balanced against fixed charges and operating costs.

Float Fibers... *their effect on* Printing

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▶▶▶ FEW THINGS ANNOY an advertising man so much as to find a printing blemish on one of his important and cherished ads.

Paper, otherwise well made and finely finished, of high brightness and passing smoothness tests, may, nevertheless, carry superficial matter that can play havoc with carefully designed advertisements. Even unavoidable things like dandy roll and wire seams may coincide with the location of part of a layout in such a way as to reappear in perhaps every second impression. To a printer, especially the kind of printer that is rather inclined to be stuffy about paper technology, such repetitious flaws look like something wrong on the plate, and he tries to correct it from that viewpoint without marked success.

The types of flaw with which this article is concerned are caused by what we proposed to call "float" fibers.

"Float" Fibers Defined

As far as we know this term has not been used before. In it we include:

1) Slitter dust
2) Fibers partly enmeshed in the surface of the sheet
3) Loose fibers between sheets in skids or rolls
4) Fibers whose impressions only remain on the sheet (These we shall call "casts.")

Causes of Float Fibers

1. *Slitter Dust.* This is the most familiar type. As its name implies, it is deprived from the operation of dividing the sheet either on the paper machine or in the finishing room.

The quantity and character of slitter dust depend largely on maintenance. When slitters are well sharpened with smooth edges, the amount of dust is at a minimum.

Slitters badly sharpened, with wire edges or nicks, will cause a lot of dust including whole fibers or groups of fibers.

Movements of air and its relative humidity, in the neighborhood of slitters, rewinders and calenders, affect the amounts of fibers remaining on the sheet.

2. *Fibers Enmeshed in the Surface and Protruding.* These are known to printers and papermakers as "whiskers." They are found on both sides of the sheet, but in the cases on which this article is based they were notably more numerous on the wire side.

A "whisker" or upstanding fiber on a sheet of paper is one only partly tied in to the formation. In the nature of papermaking, there must be many fibers on both sides that are not tucked in. Normally, these are set in place by the adhesion exhibited by fibers, aided by the sizing, if any, and pressed into place by dandy roll and the presses. Suction at the couch may tend to loosen some and entangling with the fibers of the felts may loosen others and contribute fibers of wool. These factors tend to the presence of more whiskers on the wire side.

That foreign fibers get into the sheet is well known by the photograph of a wool fiber found protruding, which pulled out part of the sheet when it was removed.

3. *Stray fibers between the sheets.* Fibers or groups of fibers lying between the sheets and identical with the furnish are likely to be the result of slitter condition. Cotton, wool and rayon are often found here and are probably due to the dryer felt, in the case of cotton, and to the clothing of operatives, or wiping rags.

4. *Fibers whose impressions only remain.* We refer to these as "casts." These may be due to any of the three previous cases, but as impressions their identity may only be guessed. They are found on both sides of the sheet but in greater number on the top side. We have found no reference in the text to this type of superficial flaw in paper surfaces. It is likely that many of these are impressions of the "float" fibers, pressed into the paper on the calender and later shaken loose. We feel, therefore, that these casts should be included in the classification of "float" fibers.

Many of these have undulations or are curved, indicating textile material. Casts on the wire side are likely to be impressions of fiber of the machine clothing. Most of them are longer than wood fibers and some are very fine and curled as if they were ravelings of silk or rayon. There seems little doubt that they are derived from the fiber of wearing apparel.

Effect of Float Fibers on Printing

1. *Slitter Dust* is largely very fine material and accumulates on the inking rollers of the printing press. One effect is that the ink becomes thicker and does not flow on freely. Good printing ink is colloidal, and slitter dust is relatively coarse; hence, the impressions on the paper lose clarity and the fine points resulting from the half tone screens tend to lack sharpness. The combined result is fewer impressions before cleanup and poorer printing.

2. *Fibers Enmeshed in the Surface and Protruding.* In many cases these are probably laid in place by the ink if the speed of the press is not great and the fiber has some anchorage.

Cases such as that in the illustration, occur when stout foreign fibers like wool result in a blemish because they do not stay down and are not pulled out. In the case shown the fiber was noticed because there was a break in the inking of a "solid" (A solid is an impression of an area of continuous ink film.) where the fiber had sprung out.

Where the "whisker" is loosely held or the ink has become tacky or thick from oxidation, it is likely to be pulled out at the point of contact with the printing plate, leaving an uninked spot on the paper. The fiber may remain on the plate, causing "ghosts" of the first blemish, but in reverse as will be noted in the case of loose fibers in the following group.

It may be transferred to the inking roll. If the paper is decidedly whiskery it aggravates the trouble arising from slitter dust. That is, fewer good impressions are possible before a cleanup.

3. *Stray Fibers.* These are largely of origins foreign to the furnish. Many are likely to be fiber groups torn out by nicks or rough edges on the slitters. They with slitter dust form a large proportion of the dust in pressrooms, add to the filling of inking rolls.

When a group of fibers is transferred to the printing plate the corresponding point or area on the paper does not receive ink. The little speck, now on the plate, is inked by the rolls, and the next impression may show a black spot with a white ring round it, because the particle, though not of appreciable thickness to the caliper, is thicker than the ink film, which therefore breaks round it. Thus a white spot on a printed solid, may have a white-ringed black counterpart or "ghost" in several successive impressions.

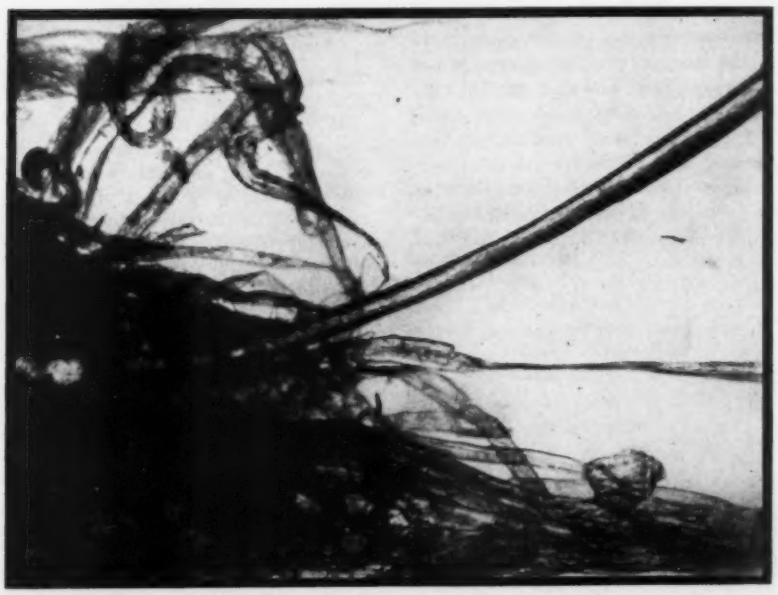
4. *Impressions or Casts of Fibers.* These being depressions do not take ink in many cases, especially fresh "short" ink.

These uninked spots show most distinctly in the "solids," but at times mar a fine detail of eyes or lips.

Investigation of Float Fiber Trouble

The publisher of a monthly had a complaint from an advertiser that in three separate copies of one issue, bought at different points, he had found flaws in the printing of his advertisement. The advertisement included a fairly large proportion of solids. Investigation was called for and the results appear worth noting, as they included a wider reference than the original objective.

In most cases the defect was a failure of the ink at the point. The shape of many of the uninked spots suggested fibers derived from textile. They had undulations as if of having been woven. It was noted that in some cases successive imprints had "ghosts" of the first defect in the same position, but in these it was either a blurring of several dots in the half-tone grid or a black spot with a white border. Evidently a particle had been picked up on the plate at the first impression and held for several imprints in succession.



Wool fiber from surface of paper. Above—X15; Below—X75

We examined first the cotton wipers used on the presses, which seemed the more logical source. We found them well made, with a selvage or hem on all sides, free from tears or holes and well woven. It is quite likely that a few fibers found their way to the paper from this source but not in the quantity indicated by the printing. Scrapings from the inking rolls were examined next. On removal of the ink by solvents, this material was seen to be chiefly composed of wood fibers with some cotton, and a few rayon. This exonerated the wipers and clearly pointed to the paper, the wood being both coniferous (sulphite) and deciduous (soda).

Material Examined

The paper used was skidded sheets 28 in. by 44 in., supercalendered, and there were parts of the skids used in three issues, including the issue on the press. A number of sheets were taken off the press as they were printed and others picked out by the pressman which showed typical flaws. Copies of several issues of the monthly were also taken. Samples taken from the skids were handled carefully to avoid disturbing the surfaces between the sheets.

50,000 Float Fibers Per Hour

The sample from one skid was cut into eight parts without opening up. Twenty-four parts representing an aggregate area equal to three whole sheets were carefully brushed off and the collected matter examined microscopically. Much of the material was too fine to identify, but fifty-two particles were large enough to classify. These were:

	Units
Wood fibers and groups (coniferous and deciduous)	33
Cotton fibers	14
Rayon	5
	52

That is fifty-two particles large enough to cause printing blemishes, lying loosely between the sheets and derived from the equivalent of three sheets, or at a press rate of three thousand sheets per hour, a total of fifty thousand possible blemishes in an hour's run. Their chances of getting into action would depend on the disturbance caused in feeding and the percentage of inked surface. If three per cent of the area were "solids" the chances would be one on every second sheet.

These loose fibers are generally referred to as "slitter dust" but the proportion of cotton and rayon, nearly forty per cent of the identified fibers,

TABLE 1—Casts on Supercalendered Stock

No. 1			No. 2			No. 3			No. 4		
Area of Sample (sq. in.)	Casts Top Side	Casts Wire Side	Area of Sample (sq. in.)	Casts Top Side	Casts Wire Side	Area of Sample (sq. in.)	Casts Top Side	Casts Wire Side	Area of Sample (sq. in.)	Casts Top Side	Casts Wire Side
140	9	1	140	10	8	154	34	16	62	16	2
20	0	0	50	18	5	154	19	4	92	16	2
20	1	0	20	2	0	154	13	0	86	13	4
140	9	5	20	3	1	..	..	..	50	3	6
28	2	1	140	36	15	..	..	..	33	14	5
348	21	7	370	69	29	462	66	20	323	62	19
Casts per 100 sq. in.	6	2		18.6	8		14.3	4.3		19.2	5.8
Casts per Sheet 28x44	74	24		229	98		176	53		236	71

indicates the wearing apparel of finishing room operatives. Thus this finding embraces two of the groups of sources, the first and third.

While all of the fifty thousand fibers and unidentified dust would not reach the inking rolls it is apparent that enough would get into the ink to have a deleterious effect in an hour's run, and three thousand an hour is not the highest speed.

"Whiskers" More on Wire Side

No satisfactory method was evolved to enumerate the second group of partially enmeshed fibers, there were undoubtedly a larger number of "whiskers" on the wire side of the sheets examined in this investigation, and in the opinion of three observers.

Enumeration of "Casts"

The procedure in finding and counting "casts" was to pass an inch square magnifying glass across the sheet between lines an inch apart, with a strong light directed at right angles to the direction of observation. The sheet was then turned through a right angle and the observation repeated. This was necessary because a cast lying with its axis parallel to the light beam was almost invisible. Only those casts were counted that were visible for their full length.

It was our opinion that in this investigation the chief cause for complaint was the incidence of such blemishes as were the result of casts.

In Table 1, No. 1 is from paper that was noted as having been satisfactory as far as printing blemishes were involved. Nos. 2, 3 and 4 were from paper of issues several months later. Nos. 1, 2 and 4 were from printed paper and the samples were from areas free of ink and of irregular size. No. 3 was from unprinted stock.

Roughly, there were three times as many on the top side as on the wire side.

The chances of one of these casts coinciding with printed solids are three times as great in samples of the later issues, Nos. 2, 3 and 4 as in the earlier satisfactory paper No. 1.

If three per cent of the area were inked, between two and three casts would coincide with an inked area of No. 1, on the top side, in each sheet. In the later product six or seven casts would coincide with ink on the top-side.

Fortunately, most of them produce no flaw apparent to the unaided eye. Further, there are indications that the less pronounced of these under the influence of time and air conditions tend to disappear due to the "life" of the fiber structure.

Prevention of Float Fibers

Hard or shivey pulp tends to produce whiskery papers and this condition is aggravated by excessive suction at the couch, as indicated by greater numbers of whiskers on the wire side. A weave that is too open on the first press felt might be a source of wool fibers, such as that in the illustration.

Care should be taken that surfaces of new dryer felts are free from loose fibers, and that in all felts there are no free ends or rubbing surfaces.

Special care should be taken when old papers are a large proportion of the furnish. This paper has not the "life" of paper made from virgin pulp and will tend to hold the sharp outline of fiber casts longer.

The chief sources of loose fibers are found in the finishing room, both from slitter maintenance, and textiles, either from the clothing or operatives, or rags.

Some form of brush or air jet just before the sheet enters the first nip of the supercalender, or roll on rewinder would help to remove loose fibers.

In view of the care taken to produce papers of good surface and printing quality, it appears well worth while to take these extra precautions to protect the surface and avoid unnecessary interruptions at the printing press, not to mention the exasperation of the artist or advertiser.

Public Relations Program Increases Waste Paper Supply

Prepared by the staff of FRANK BLOCK AND ASSOCIATES

▶▶▶ THE FIRST PUBLIC relations program of its kind in the paperboard industry is now ending its twentieth month of successful operation.

The Public Relations Committee of the Midwest Consumers of Waste Paper, headed by W. H. Beckwith, has extended its program over eight middlewestern states with the dual purpose of improving both the quality and the quantity of waste paper shipments. The Committee includes W. Irving Osborne, Jr., P. S. Schilling, K. W. Schneider, and M. W. Swain, and is counseled by Frank Block and Associates of New York and St. Louis.

With waste paper inventories high, and mills operating at 103 per cent capacity, the raising of quality rather than quantity of receipts is receiving primary attention today.

A fleet of Public Relations men, staff members of the Block firm, pay regular visits to the 440 waste paper dealers in cities of 100,000 or less throughout the region which includes Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, Ohio and Wisconsin. Opinion is surveyed and brought back to the mills, and mill suggestions are transmitted to the dealers.

An invaluable rapport is being established between the two. But over and above this good will, the program aims to achieve certain highly tangible results.

Baler Use Encouraged

Dealers are being offered specific pointers on cleaning methods, packaging methods, shipping methods. A main point of emphasis is the desirability of the 72-inch baler producing 1000-1200 lb. bales.

Dealers are told how they will benefit by shipping their product in its most usable form. For example, in a brochure published this summer, and now being distributed by the Block field force to the entire dealer group, the advantages of the 1000-to-1200-lb. bale are shown in detail, and its adaptability to easy and correct freight car loading is pictured.

A baler survey, conducted in eleven midwestern states by the Committee last year, laid the groundwork for initiating a full-fledged campaign to encourage and assist dealers in the acquisition of proper baling equipment. The Committee, in its survey, found that over three-fourths of the 498 dealers interviewed favored improving their baling facilities and expanding generally.

The surveyors also dug out facts on the relationship between adequate baling facilities and the dealer's own profits. This information is now being made available to dealers to stimulate the purchase of more balers. The survey uncovered, for example, many instances where dealers complained of low volume, but upon further investigation, found their problem actually to be one of inadequate equipment to handle the volume available.

On the basis of the survey, the Committee set out to show specific instances where better baling practices could increase profits. It is demonstrated that one dealer, by sorting and baling 10 tons of waste paper, under the market prices of September 10, 1946, grossed $241.50 compared with $140 paid to another dealer for a similar 10 tons of loose, ungraded paper. And, of course, the point is not lost that the first dealer saved additional sums on his own handling cost, kept mill cost down, and increased the confidence of the industry in his product.

Case Histories Cited

The brochure already mentioned, *The Waste Paper Industry, Its Problems and Prospects for the Future*, has actual case histories of five separate dealers, showing the volume of waste paper that must be collected, graded, baled, and shipped each month to make a baler purchase profitable, and how a dealer can be assured that he will profit by the investment.

Each of the five dealers cited processed from 2,400 tons down to 420 tons of waste paper per year, each in towns ranging in population from 50,000 to 3,000. Naturally, individual cost estimations varied, but the following facts were shown:

(1) High yearly profits ranging from $10,560 to $3,780 (before owner salaries) were shown for each of the five dealers. Per ton profit ranged from $9 to $4. Plant and plant equipment evaluations from $40,000 to $7,500.

(2) Average cost of paper per ton to each dealer ranged from $17.50 to $15.

(3) One dealer estimated that his baler, valued at $2,694 installed, paid for itself in less than six months.

Obviously, no matter how much paper the individual dealer was handling, he was making money. The Committee and its dealer-directed literature stresses that if there is enough wastepaper in a town to warrant the establishment of a waste-paper dealer, there is little risk involved in purchasing equipment to make his waste paper more salable. The dealer is assured that, "When he improves his product, he also improves his market."

Clean Stock Urged

Considerable attention is also centered on the cleaning of stock. The following list of recommended outthrow has been presented to dealers by the Committee:

Asphalt
Carbon Paper
Cellophane
Cloth Book Covers
Felt Furniture Pads
Floorsweepings
Friction Board
Glassine
Glazed Paper
Greased Paper
Heavy Cores
Linoleum
Metals
Oil Treated Paper
Paper Twine
Paper Wrapped Excelsior
Paraffined Paper
Parchment
Pressboard
Rags
Restaurant & Soda Fountain Refuse
Roofing
Rubber
String
Tar
Tympan and Used Wallpaper
Used Billboard Stock
Vulcanized Fiber
Waxed Paper
Wirebound and Metal-edged Boxes

The dealer is encouraged to "create confidence in his pack" and is reminded of the undeniable fact that "someone has to clean the pack somewhere along the line."

Sorting and grading also receive detailed attention, and improved shipping practices are resulting from

dealer education on minimum weights, loading, and handling. Dealers are shown how the shipping of "light" cars is financially unsound and costly from their own point of view. They are advised to load only one grade to a car, to reduce the handling expenses involved in shuttling cars around the mill yard.

Again this is put in dealer terms: "Any car detained more than 48 hours by a mill is subject to demurrage charges which run as high as $16 a day for cars held more than seven days. And, of course, any undue expenses in handling eventually must be reflected somewhere along the line, most likely in future prices paid to dealers." Smaller dealers whose volume or storage space precludes the possibility of shipping only one grade to a car are shown how two grades should be segregated.

Dealers are also being encouraged to mark or label each bale with the weight, grade, and dealer's name to obviate the necessity of reweighing the bale at the mill, and to aid the dealer in checking his own inventory.

High-Quality Trend Noted

Platform for this extensive advice is the long-term postwar trend to quality. "Buyers are being forced by the competitive market to become more discriminating and selective," the Committee explains to dealers. "A return to normalcy brings back strong competition which in turn forces products to vie with one another for top place on the consumer's shelf. And refining methods, packing methods, and shipping methods are as important to waste paper and its market as they are to any other product."

The mills are also taking cognizance of the fact and passing it on to dealers that many of the new war-discovered uses for paper call for better-than-average quality. The growing use of paper for container purposes, for example, demands paper strong enough to stand the test of weighty contents. A "'golden age" of market expansion for industry lies ahead, in other words, if enough of the right kind of supplies can be produced at a sufficiently low cost to meet prospective demand. If this can be done, obviously it will increase the cash in the pockets of both mill and dealer.

Background of Program

This preparatory public relations-wise approach to the future actually began in June of 1941 when war clouds were still in the gathering stage. At that time the problem was sheer quantity of waste paper.

An experimental campaign in St. Louis was arranged that spring by the late G. G. Otto, vice president of the Alton Box Board Company. This campaign, to increase the flow, was based on publicity and advertising appeals to the general public to "save and sell" waste paper. The campaign, conducted by Frank Block, who was at that time vice president of the Olian Advertising Company, St. Louis, referred the public to a designated telephone number, and the many thousands of telephone calls received were equitably distributed among dealers. The experiment produced 25 per cent more volume in St. Louis than that handled by dealers previously.

The entire industry took up the cue and $800,000 was raised to set up a similar program in 57 key cities. A Conservation Committee of the Waste Paper Consuming Industry was formed to direct the program, with William H. Beckwith as chairman and Frank Block as account executive. On the Committee were Norman F. Greenway, vice president of the Robert Gair Company, New York City; Herbert M. Kieckhefer, vice president of the Kieckhefer Container Company, Camden, New Jersey; J. J. Brossard, vice president, Container Corporation of America, Philadelphia; Paul A. Schilling, president of the Waldorf Paper Products Company, St. Paul; and G. G. Otto, vice president, Alton Box Board Company, Alton Ill. (deceased).

In other words, months prior to Pearl Harbor, the paperboard industry was getting set to supply itself with raw materials for the coming crisis.

This 57-city campaign produced in six months a greater flow of waste paper than has been received in the history of the industry. Our entrance into the war stimulated the program, of course, by giving additional patriotic incentive to the waste paper-saving public.

At the same time, the complete retooling of American industry generally, required by the war, resulted in a temporary cutting-down of demand for paper products. The paperboard industry found itself ready for war before many of its customer industries. Result was a temporary over-inventory of waste paper and a curtailment of consumption.

However, when America's war machine swung into high gear, demand for war-needed paper rose quickly. The high stocks of waste paper, plus the activities of the Salvage Division of the Office of Production Management (later War Production Board), took care of the needs until the fall of 1943. At that time, it became evident that demand was rapidly out-pacing supply.

War Salvage Campaign

Mr. Kieckhefer became chairman of the Conservation Committee and Mr. Otto, who had become director of the Paperboard Division of the WPB, was replaced on the Committee by W. Irving Osborne, Jr., President of Cornell Wood Products Company, Chicago. Frank Block, who was working on another paper industry committee, The War Activities Committee of the Pulpwood Consuming Industry, was borrowed to counsel a full-fledged industry-sponsored waste paper salvage program.

The Committee recognized that no all-out program could succeed without the complete co-operation of the nation's press. An arrangement was worked out with Donald M. Nelson, chief of the WPB, and the American Newspaper Publishers Association, whereby the three groups would unite under the leadership of the ANPA to get the waste paper supplies needed to keep overseas troops supplied with paper-packaged food and material. The executive committee of the U. S. Victory Waste Paper Campaign had Edwin S. Friendly, publisher of the *New York Sun*, as chairman, and Tom Cathcart of *This Week* magazine, Cranston Williams, general manager of ANPA, and H. B. Fairchild, assistant to the publisher of the *New York Sun*, as members.

From the fall of 1943 to the end of 1945 the entire nation was mobilized and made conscious of the need for waste paper. This raw material became as important in the public mind as any other one item:

Over 2 million school children organized into paper troopers and supplied with insignia of Army rank, collected hundreds of thousands of tons of waste paper from neighboring housewives.

Through the co-operation of the United States Army, an authorization from General Eisenhower was obtained for an Eisenhower medal bearing his likeness, to be awarded to Boy Scouts who fulfilled certain requirements and goals in the paper collecting campaign. Over 250,000 Scouts qualified.

Through the American Newspaper Publishers Association, over 1,500 daily newspapers made this campaign a definite war responsibility. Not a paper in the United States failed to carry more than two or three stories a week. As high as 32 items in one day of the campaign were counted in one Metropolitan newspaper.

Such top flight writers as the late Ernie Pyle and William L. Shirer, were obtained for by-line features

promoting the campaign. Through such techniques, a high sustained readership was guaranteed despite the tremendous amount of newspaper lineage devoted to the subject.

Paperboard production was given the needed supplies. The intake of waste paper enabled paperboard production to jump from 8,528,000 tons in 1941 to 9,747,000 tons in 1946. In 1941, 6,075,000 tons of waste paper were consumed; in 1946, 7,296,000 tons.

Postwar Stage

After V-J Day, the Midwest Consumers of Waste Paper realized that the keystone of the whole wartime program had been the new co-operation developed between dealer and mill—that the job could have never been done without the dealers' active interest.

It was this recognition of the dealers' importance that led to the establishment of a special Public Relations Committee of this organization to:

(1) Be on hand if and when waste paper shortages developed in the future, and

(2) Work out methods of maintaining and increasing the good will that had been developed by the consuming and producing members of the industry.

It is to this end that the present peacetime program outlined earlier has been developed. Postwar competition is forcing the production of uniformly better products, and the Committee, as its main job just now, is out to obtain full dealer co-operation in meeting the market's challenge.

Mercury-Balance Method for the Measurement of Gel Strength

▶▶▶ AN IMPROVED method for more precise measurements of the tensile strength of gels has been developed by W. J. Hamer, of the National Bureau of Standards. This procedure, which gives the strength or "yield value" and resistance to deformation of the material under study, essentially involves the determination of the shearing force necessary to fracture the gel as given by the weight of mercury required to pull a standard disc from the gel in which it is imbedded.

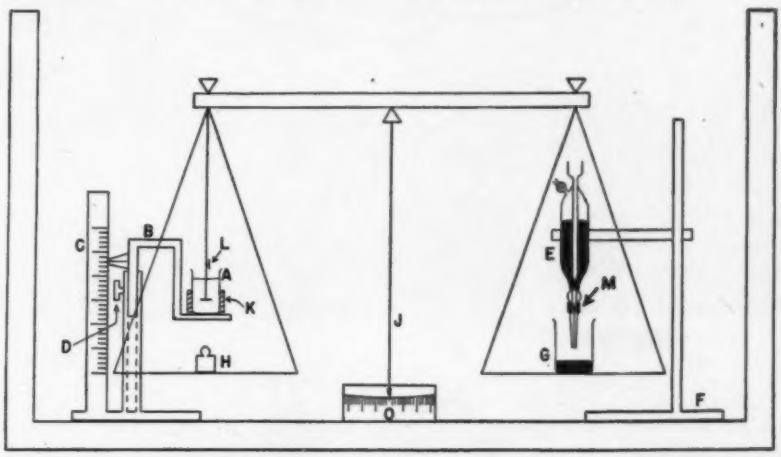
In several of the applications of gelatin, glue, starch, agar, and various gums, it is important to know the tensile strength of the gel or jelly. This property was originally measured by comparison with a set of arbitrary standards on the basis of the resistance offered by the gel to finger pressure. Although such a procedure was undoubtedly satisfactory for many commercial purposes, there was need for a more objective method.

Accordingly, the National Bureau of Standards has developed a precise objective method for gel-strength measurement. The method involves the balancing of the cohesive forces of the gel against a gradually increasing quantity of mercury until the yield point is reached and the gel is broken.

A brass disc is suspended in a beaker containing the gel by means of a wire attached to one beam of an analytical balance. An adjustable platform over the balance pan supports the beaker. The gel is covered with liquid petroleum to prevent "skin" formation. Mercury is added from a burette at a constant rate to a container on the other pan. Different flow rates are made possible by use of a removable capillary tip held to the burette by a rubber tube. The capillary tip is calibrated before use by weighing the mercury it delivers in a given time. As the mercury is added, the height of the platform is changed manually, so that the pointer of the balance is always kept at zero. A vertical scale indicating the height of the adjustable platform is read at frequent regular intervals until the gel is broken.

The weight of mercury required to produce a fracture in the gel, divided by the area of the brass disc gives the gel strength in grams per square centimeter. The rate of change in height of the adjustable platform gives an indication of the resistance the gel offers to deformation. A fast rate means that the gel is easily deformed, whereas a slow rate indicates that the gel resists deformation and is probably quite rigid. Although rigid gels usually offer high resistance to deformation, this is not always true.

This method has a precision greater than 0.5 per cent. Its limitations lie more in the reproducibility with which gels can be prepared than in errors inherent in the method. It may be applied to all types of gels, whether they are of the reversible (gelatin) or irreversible (starch) type.



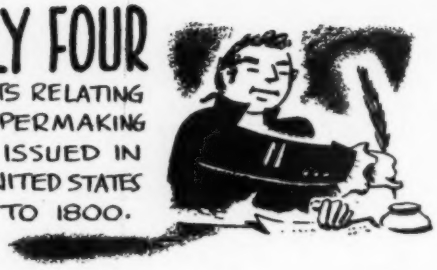
Schematic drawing of the apparatus developed at the National Bureau of Standards for accurate determination of the tensile strength of gels through measurement of the weight of mercury required to pull a standard disc from the gel in which it is imbedded. A brass disc, 1/16 inch thick and ⅝ inch in diameter, is suspended in a gel by a brass wire fastened to a hook (L) hanging from the beam of an analytical balance. The gel is covered with liquid petroleum to prevent "skin" formation. A beaker (A) containing the gel and disc is placed over one pan of the balance on an adjustable platform (B) with scale (C). The beaker is held in place by a lead mold (K). Mercury is added from a burette (E), supported by a stand (F), to a beaker (G) on the other pan of the balance. The beaker is tared with a weight (H). A special burette (constructed on the principle of the Mariotte flask) is used, in which a constant head of mercury is maintained, so that mercury is delivered at the same rate regardless of the amount in the burette. Different flow rates are made possible by using a removable capillary tip held to the burette by a rubber tube (M). The capillary tip is calibrated before use by weighing the mercury it delivers in a given time. As mercury is added to the beaker (G) the height of the adjustable platform (B) is changed by a screw (D), so that the pointer (J) of the balance is always kept at the zero mark. Readings on the scale (C) are made at regular intervals, timed with a stopwatch, until the gel breaks. Gel strength is computed by dividing the weight of mercury required to produce a fracture by the area of the brass disc. In addition, the rate of change in height of the adjustable platform gives an indication of the resistance offered by the gel to deformation.

Paper SKETCHES . . . . . .

According TO A 17th CENTURY CHINESE ENCYCLOPÆDIA, PLAYING CARDS WERE DEVISED IN CHINA IN 1120 A.D. FOR THE AMUSEMENT OF THE WOMEN IN THE HOUSEHOLD OF SÉUN-HO.

ONLY FOUR

PATENTS RELATING TO PAPERMAKING WERE ISSUED IN THE UNITED STATES PRIOR TO 1800.

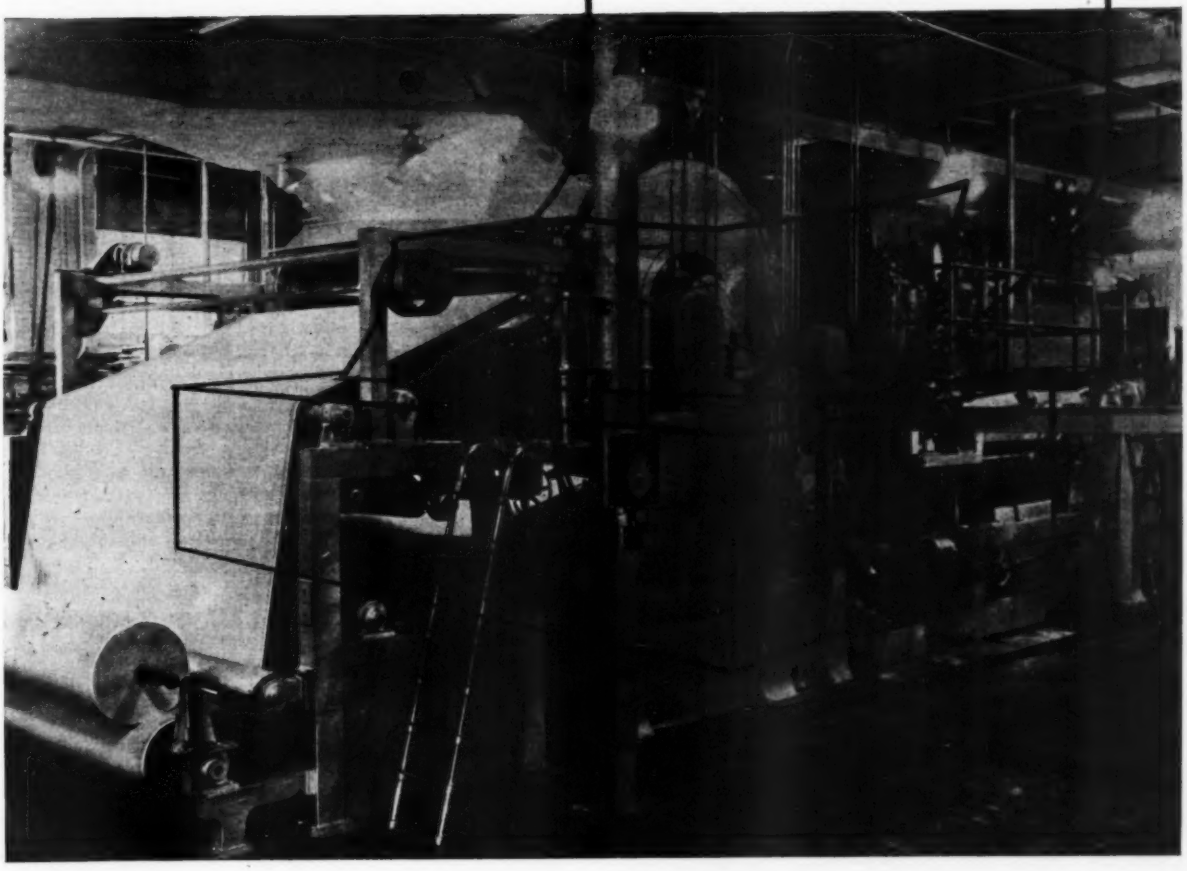


AS EARLY AS THE 1860'S, M. CARDON DE BURGES, PAPERMAKER OF LOIRET DEPARTMENT, FRANCE, WAS USING OLD ROPES OF SHIPS TO MAKE TARRED PAPER FOR WRAPPING HARDWARE AND CUTLERY.

...the fifteen WALLPAPER MILLS OF ILLINOIS ARE REPUTED TO PRODUCE ABOUT 40 PER CENT OF ALL THE WALLPAPER MANUFACTURED IN THE UNITED STATES. SIX MILLS IN JOLIET ACCOUNT FOR ONE-THIRD OF THIS PRODUCTION.

This Machine Makes . . .

TISSUE



140" Fourdrinier Machine

MAKES CLEANSING TISSUE

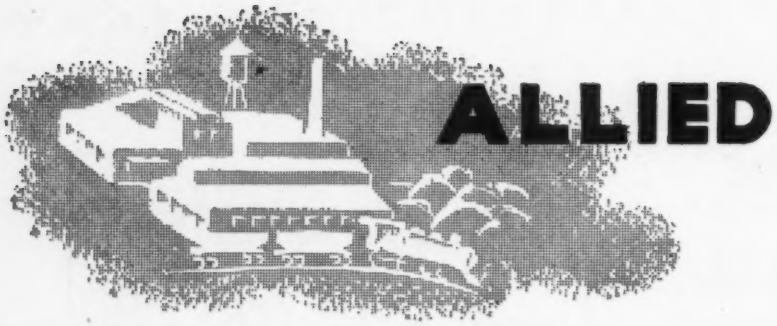
This 140" Bagley & Sewall Yankee fourdrinier makes cleansing and a variety of other absorbent and non-absorbent tissue.

There's a care and precision in the design and construction of Bagley & Sewall machines that assures a smooth running piece of equipment . . . with 77 years' manufacturing experience behind them. Write us when considering new machines.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

WATERTOWN, NEW YORK



DOW CO. MARKS 50TH YEAR

In the company's 50th annual report to its stockholders, the consolidated sales of The Dow Chemical Company, Midland, Michigan, set a new all-time high of $130,426,838 for the fiscal year ended May 31. This was 28 per cent above the sales attained the previous year and approximately 4½ per cent above the wartime peak of $124,570,200 set during the fiscal year 1944-1945.

The vast business of this great company has grown from a very humble beginning when Herbert Dow, its founder, became interested in the Midland City (Mich.) salt wells fifty years ago.

He started the Midland Chemical Company in 1890, which was incorporated in 1892. Improvements and new processes led to the incorporation in 1897 of a second company, The Dow Chemical Company. A few years later, in 1900, The Dow Chemical Company absorbed the Midland Chemical Company thus completely joining the two enterprises.

When the Dow Company started exporting its products in 1905, there was much trouble with Germany. But Dow finally won out. When World War I started, imports of important chemicals were cut off and the Dow Company found a ready market for its products. Production had to be developed which was not useful in peacetime, but the demand for American-made chemicals was more than had been anticipated and many new processes were developed in the next decade which would otherwise have taken many more years of development. So in 1918, when the war was over, The Dow Chemical Company was well grown to manhood, having 21 years of experience. Following the dark days of the depression of 1929 when all business fought for its existence, the Dow Company suffered another blow—the death of its founder in 1930. But his son, Willard H. Dow, who had been assistant general manager took over his father's responsibilities. He had studied chemical engineering at the University of Michigan and had practically been brought up in the atmosphere of the business. The company's progress under his leadership has been phenomenal. New products have been developed, perhaps the most outstanding of which was the successful extraction of bromine from sea water in 1932, followed by the extraction of magnesium from the same source nine years later. Then followed such products as Styrene and butadiene, both of which were vitally needed during the war in the manufacture of synthetic rubber.

Under the leadership of Dr. Willard Dow, this company enters its second half century. It is already counted as one of the leading chemical industrial plants of this country.

◆

▶▶▶ A LONG-TERM CONTRACT has been announced between U. S. Industrial Chemical, Inc., and Stanolind Oil & Gas Company for the sale by U.S.I. of all water soluble oxygenated chemicals to be produced at the first two synthetic gasoline and oil plants using the much-publicized Fischer-Tropsch process. The announcement is an event of the utmost importance to all chemical-consuming industries, as the process will provide a dependable new source of these much-needed chemicals at good competitive prices.

◆

MONSANTO ERECTS PLANT FOR PRODUCTION OF ITS SYNTHETIC DETERGENT

Completion of a new $3,000,000 plant at Monsanto, Illinois, for the manufacture of Santomerse No. 1, a synthetic detergent with a wide variety of industrial and home uses, has been announced by Monsanto Chemical Company. Production will also continue at Monsanto's Nitro, (W. Va.), plant, which has manufactured Santomerse for many years.

Among the numerous advantages possessed by Santomerse is the ability to function efficiently and economically in water which is hard or soft, hot or cold. It is available in two dry forms, bead and flake. The flake form has been used in industry for numerous dyeing, bleaching, and cleaning processes, including wallpaper removing and paper stock de-inking.

◆

HERCULES TO TRANSFER CASEIN OPERATIONS TO ITS MILWAUKEE PLANT

Hercules Powder Company will expand its operations at the Paper Makers Chemical Department's Milwaukee plant. The casein blending and grinding operations will be moved from Chicago to the Milwaukee plant which heretofore manufactured rosin size and other chemicals for the paper industry. The Chicago plant is being closed.

The casein, which will be tailormade to customer specifications in the Milwaukee plant, is shipped from Hercules plants in Elroy and Durand, Wisconsin, and Cambridge and Watertown, Minnesota.

◆

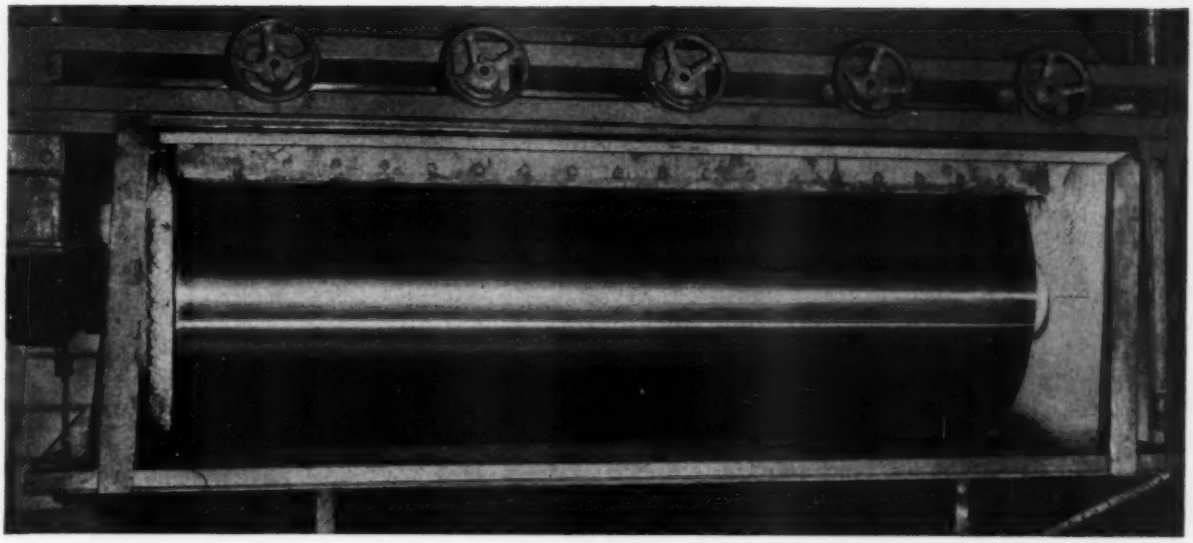
▶▶▶ A NEW PLANT was recently completed in Chicago by the Glidden Company for the commercial recovery of soya sterols which represents the culmination of six years of intensive work by Dr. Percy L. Julian, director of research for the Soya Products Division of the company, and his staff. The new plant in all stages of production will employ new processes developed entirely by the Glidden research organization.

◆

FIRM OF CIRVES & PEDERSEN

A partnership known as Cirves and Pedersen, Consulting Engineers and Chemists, 2834 West 65th Street, Chicago 29, Illinois, has been announced by Francis J. Cirves and Henry W. Pedersen. This partnership will serve the pulp and paper and related fields of conversion, with activities including research and development, engineering, design, plant equipment and operation.

Mr. Cirves received his B. S. degree in chemical engineering in 1921 and a M.S. degree in colloids in 1930 from the University of Wisconsin. His scientific and technical literature have been published in *The Journal of Physical Chemistry, Technical Association Papers* of TAPPI, and THE PAPER INDUSTRY AND PAPER WORLD. He holds several patents. One is for the bleaching of pulp by means of liquid chlorine which has been performed in an open beater and obviates hypochlorite equipment and preparation. Another is for the production of tall oil by means of a continuous process, necessitating a minimum of equipment space. His experience also embraces the paper conversion field of treating, coating, and laminating to produce dielectric,



PRODUCTION UP 25%
with Lukenweld Jacketed Drier Rolls

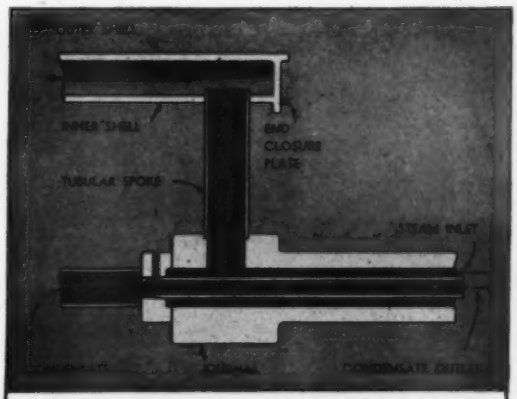
(PATENTS APPLIED FOR)

Production went up 25 per cent when Lukenweld *Jacketed* Drier Rolls replaced drum-type cast rolls in the machine shown above.

No other changes were made—increased production was entirely due to the greater drying efficiency and positive method of condensate removal provided by Lukenweld design and welded steel plate construction. Records, since installation of these rolls nine years ago, show that steam consumption was substantially reduced.

Whether planning new machines or looking for ways to increase production from your present equipment, you can make important savings with Lukenweld Jacketed Drier Rolls. With no increase in steam pressure, users report drying efficiency increased by 15 to 25 per cent. At higher steam pressures—up to 350 psi. with safety—efficiency increases are much greater. Welded steel construction permits a design that meets and maintains exacting dimensional tolerances.

The complete story about Lukenweld Jacketed Drier Rolls is contained in Bulletin 358. For your copy, write Lukenweld, Inc., 408 Lukens Building, Coatesville, Pa.



Lukenweld jacketed design effects superior heat transfer by keeping steam in constant circulation against the roll face, while removing condensate as rapidly as it forms. The rolls used in the machine illustrated above are 11′ 3⅜″ over-all by 2′ 8″ O. D. with a 7′ 6″ face.
Sizes from 2 feet to 18 feet O.D. and over.

Sizes from 2 feet to 18 feet O. D. and over

LUKENS LUKENWELD DIVISION

LUKENWELD, Inc.

DRIER ROLLS AND DRYING MACHINERY

oil, moisture, and vapor proof qualities, as well as antitarnish, antirust, and antitack papers.

Mr. Pedersen was employed with the H. P. Smith Paper Company for 34 years, serving in various capacities from operator to superintendent. He served as director and vice president for over twenty years. He pioneered in paper conversion, developing oiling, waxing, and laminating machinery which perform dual and multiple operations. He also pioneered automatic tension controls for high speeds and is said to have built the first rubber rolls for slitters and rewinders.

◆

BAKER-RAULANG TO DOUBLE ITS PRODUCTIVE CAPACITY

An addition to its No. 2 factory at 8200 Baker Avenue is being erected by The Baker-Raulang Company, Cleveland. The four 40-foot by 180-foot bays with craneways adjacent to switches from the New York Central Railroad will provide improved facilities for the assembly, finish testing and shipping of heavy power industrial trucks, tractors, and cranes for its industrial truck division.

Following the completion of the structure now under way, it is proposed to erect five additional bays for heavy machine operations. According to E. J. Bartlett, president, the two additions together increase productive capacity for material handling equipment approximately 50% over that operated during 1946.

◆

▶▶▶ AS A RESULT OF negotiations, effective immediately, executive and administrative employees in the factory and office of F. C. Huyck & Sons of Rensselaer will receive three weeks vacation with pay if they have been employed by the company since December 1, 1946. All employees with a total of twenty years of service, not necessarily continuous, on or before December 31, 1947, also will receive three weeks vacation with pay. Employees with 35 years of service will receive four weeks pay.

◆

BROWN CO. ANNOUNCES TWELFTH YEAR OF ITS INSTRUMENT SCHOOL

For the twelfth consecutive year the Brown Instrument Company is conducting continuing courses of training in industrial measuring and control devices at its school of instrumentation in Philadelphia.

Classes for the full semester will be composed of engineers and instrument staff members of customers of the industrial division of Minneapolis-Honeywell Regulator Company, including representatives from China, India, and other countries. The course will include instruction in pyrometers, continuous balance electronic potentiometers, electrical and air-operated automatic controls, flow meters and thermometers.

◆

▶▶▶ A GENERAL EXPANSION program which will increase its overall Canadian productive capacity by at least 100 per cent in two years was announced by Monsonto (Canada) Limited at the Canadian National Exhibition. Vice president Leo E. Ryan said a substantial increase would be made in productive capacity for phenolic resins which are produced at Montreal together with polystyrene and that a new building program already was under way at the Montreal plant.

◆

CONSTRUCTION BEGINS ON STALEY CO.'S $10 MILLION MODERNIZATION PROGRAM

Construction operations on a $10,835,000 modernization program for the A. E. Staley Manufacturing Company, Decatur, Illinois, have been under way for several weeks. The H. K. Ferguson Company is in charge of the construction project.

The goal of the program, according to Staley and Ferguson engineers, is to make the plant the most efficient in the industry. The process for producing modified starches, particularly for the paper and textile industries, will be streamlined and increased in capacity. Production at the plant will be maintained throughout the building program.

◆

SKF INSTALLS MACHINERY IN NEW HORNELL FACTORY

New plant facilities at Hornell, New York, will provide SKF Industries, Inc., with capacity that will enable the ball and roller bearing firm to achieve an 80 per cent increase in production of pillow blocks at peak operation.

The transfer to Hornell of the company's cast iron department and of the bearing retainer department to Shippensburg, Pennsylvania, is part of a two-year $4,000,000 expansion and modernization program aimed primarily at increasing by 50 per cent the output of spherical roller bearings in the firm's two Philadelphia plants. Removal of machinery to the two new plants will be made over a period of several months in order to keep production interruptions to a minimum.

THROUGH THESE DOORS PASS
THE MOST DIFFICULT LINING AND TANK PROBLEMS

They enter because gathered under this roof is a vast reservoir of practical and theoretical experience amassed over 63 years specialization in designing, constructing, and servicing linings and tile tanks used in the various pulp and paper making processes.

Since its beginning Stebbins has been closely allied with all new developments. Just now Stebbins engineers are actively engaged on linings for use in the ammonia and magnesia base cooking process.

When you have a lining or tile tank job consult Stebbins.

Stebbins Engineering and Manufacturing Company
EASTERN BOULEVARD, WATERTOWN, NEW YORK

FINISHING OPERATIONS SIMPLIFIED

by BROWN MOIST-O-GRAPH

Simplification of finishing operations begins at the paper making machine with a properly dried sheet.

The Brown MOIST-O-GRAPH continuously indicates and records changes in sheet moisture and signals the operator when the variation is beyond predetermined limits. The MOIST-O-GRAPH thus guides the operator in making machine adjustments to ***consistently*** produce paper of the ***desired*** moisture content. Poor finish, wrinkling and blackening can be eliminated. Uniform weight can be maintained throughout an entire run.

The Brown MOIST-O-GRAPH in service as long as eight years on some machines has proved to be the answer to one of the paper makers most difficult problems.

Previously restricted by production conditions, the Brown MOIST-O-GRAPH is now available for sale anywhere in the United States or Canada. Now is the time to investigate—call in the nearest Brown engineering representative or write for full information to:

THE BROWN INSTRUMENT COMPANY, 4488 WAYNE AVENUE, PHILADELPHIA 44, PA.

DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR CO.

SUBSIDIARY COMPANIES IN TORONTO, MEXICO CITY, LONDON, STOCKHOLM, AMSTERDAM, BRUSSELS

NEW PAPER INDUSTRY CONTROL CATALOG

This new bulletin entitled, "Control Instruments for the Paper Industry" describes the MOIST-O-GRAPH and many other control systems which are boosting quality and lowering costs in the Paper Industry today.

This informative booklet will be sent to you without obligation. Write for Bulletin No. 2801.

BROWN MOIST-O-GRAPH

PULPWOOD IN THE LAKE STATES SUBJECT OF TALK GIVEN BY E. W. TINKER

At a meeting of the Wisconsin-Upper Michigan Section of the Society of American Foresters, held at Houghton, Michigan, August 8, E. W. Tinker, executive secretary of the American Paper and Pulp Association, spoke on the subject "The Pulp and Paper Industry and Pulpwood in the Lake States."

Before he became associated with APPA, Mr. Tinker was regional forester for the United States Forest Service, in charge of the North Central Region. Following are some highlights of his address:

According to the records, there are 17,385,000 acres of commercial forest lands within the state of Michigan; there are 57 paper and paperboard mills and 9 wood pulp mills within the state's boundaries. These mills produce over a million and a quarter tons of paper and paperboard, and over 200,000 tons of wood pulp. According to our surveys, they produced, in 1945, products with a sales value of $288,000,000. The capital invested amounted to nearly $300,000,000, and the payrolls required $34,113,000 annually. According to the last census figures available, the industry ranks fourth in the state in wage earners employed and fifth in the value of the products manufactured. Five communities in the state were 92 to 100 per cent dependent on the mills for their existence.

The annual requirements for the operation of the pulp mills is about 300,000 cords of wood. This is but one cord annually for every 50 acres of the over 17 million acres of commercial forest land in the state. A conservative annual yield of one-half cord per acre would require only 3½ per cent of these acres to raise enough pulpwood to meet the present requirements in perpetuity.

At the present time approximately 165,000 cords of pulpwood are imported because of shortages of wood of needed species.

It is natural that the economic situation with regard to pulpwood supplies for individual units will vary, but no company can afford not to investigate thoroughly the possibility of forestry enterprises that will not only assure a wood supply at reasonable prices, but will eliminate uncertainty with respect to continuity of supply. This situation applies with equal force in all of the Lake States.

I am happy to say that the pulp and paper industry is making tremendous strides in its forestry enterprises in this country. Company-owned lands now exceed 15 million acres, and practically all of this land is being managed with a view to the future. However, with the industry's requirements approaching 20 million cords of wood, and involving great sums of money, I believe it is entitled to the same engineering skill and attention as is customarily given in the construction of the mills themselves.

◆

WILBUR F. GILLESPIE IS NEW PRESIDENT OF TAPPI

The Technical Association of the Pulp and Paper Industry has issued an official announcement that Wilbur F. Gillespie, of the Gaylord Container Corporation, Bogalusa, Louisiana, has been elected president of the Association to fill the vacancy caused by the death of Worthen E. Brawn. This term extends to the annual meeting which will be held in February, 1948. Mr. Gillespie was elected vice president of the Association at the last annual meeting.

Wilbur F. Gillespie

The election of Mr. Gillespie to the presidency was passed by the TAPPI Executive Committee in accordance with Art. V, Sec. 5 of the Association's constitution.

As yet no one has been elected to fill the vacancy created in the office of vice president.

◆

LABOR SITUATION WILL BE STUDIED AT SPECIAL 2-DAY CONFERENCE OF AMA

The American Management Association has announced a two-day national conference of industrial relations executives October 2 and 3 in New York to appraise the current labor situation, changes in labor-management relations in the light of recent legislation, and to exchange experience with problems of employee communication, wages, and training. More than 1,500 executives representing virtually every type of U. S. business will attend, with representatives of industry, government, and labor participating in the discussions.

In addition to experience with application of the Taft-Hartley Act, the six sessions of the meeting will examine employee opinions of business, collective bargaining, case stories and criticisms of methods of company communication with employees, economic factors presently influencing wage scales, and similar subjects. Topics for discussion are being selected on the basis of a poll of more than 1,000 industrial relations executives. The meeting will be held at the Hotel Pennsylvania, New York City.

◆

KALAMAZOO TAPPI PROGRAM

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry has announced the following schedule of meetings for the 1947-1948 season:

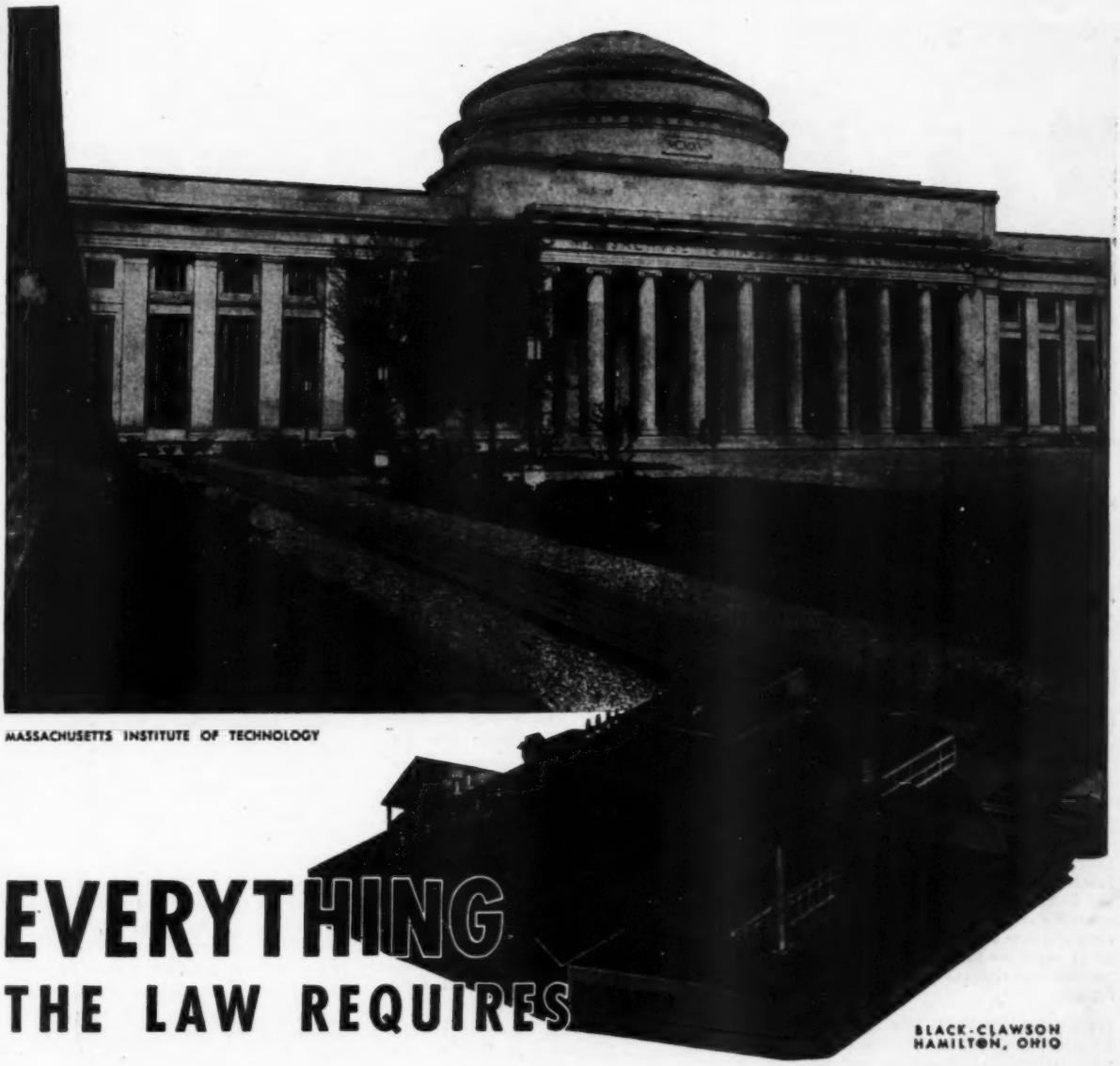
October 2.—Organization and Function of a Technical Department. Program in charge of W. A. Kirkpatrick, Allied Paper Mills.

November 6.—Quality Control. Richard Trelfa, Hercules Powder Company, in charge.

December 4.—Coating Victor Burstein, Michigan Paper Company, in charge.

January.—Joint meeting with Superintendents Association.

February 5.—Water, White Water,



MASSACHUSETTS INSTITUTE OF TECHNOLOGY

EVERYTHING
THE LAW REQUIRES

BLACK-CLAWSON
HAMILTON, OHIO

From A to Z—everything for the engineer—at our top ranking engineering schools. From Alpha to Omega—"everything for the paper mill"—at Black-Clawson, Shartle, Dilts.

If it's preparatory equipment, take it up with Shartle or Dilts. If it's paper machines, drives, and finishing equipment, contact Black-Clawson at Hamilton. If it's converting machines, look to Dilts.

For experienced advice on paper making techniques, look to all three divisions. Their long association with the mills and broad experience in mill equipment engineering should stand you in good stead.

The Black-Clawson Co.

Hamilton, Ohio

DIVISIONS: SHARTLE BROS. MACHINE CO., MIDDLETOWN, OHIO
DILTS MACHINE WORKS, FULTON, NEW YORK
ASSOCIATE: ALEXANDER FLECK LIMITED, OTTAWA, CANADA

Serving the City of QUITO, ECUADOR

In Quito, Ecuador, almost astride the equator at an elevation of over 9 thousand feet, 5 Layne Well Water units are now producing 2,280,000 gallons of water per day. Highly pleased with the proven efficiency, low operating cost and outstanding quality, Quito's city officials have just ordered another 5 Layne Wells and Pumps for another section of the city.

Designed and installed by U.S. trained engineers, Quito's complete Well Water Supply will be equal in every way to the finest on the North American Continent.

Layne Well Water Systems are universally favored the world over. They are designed and built to give the utmost in long life and operating satisfaction. Layne has many such installations in the Latin American countries, all of which are fully measuring up to their reputation of high efficiency and low operating cost.

If your city, railroad, factory, packing plant, ice plant, or irrigation project is in need of more water where production cost per million gallons must be extremely low, you should have complete facts about Layne Well Water Systems and Layne Vertical Turbine Pumps. For literature, address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tennessee

● **pumps for wells, lakes, rivers, reservoirs, irrigation—or for any use where large quantities of water must be produced at low cost. Sizes range from 40 to 16,000 gallons per minute. Write for Layne Pump Catalog.**

LAYNE
WELL WATER SYSTEMS
vertical turbine pumps

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc., Seattle, Wash. * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minn., Minneapolis, Minn. * International Water Supply Ltd., London, Ont., Can. * Layne-Hispano Americana, S. A., Mexico, D. F.

GREEN CROSS FOR SAFETY — SAFETY

ANNUAL SAFETY CONGRESS SESSIONS WILL BE HELD IN FOUR CHICAGO HOTELS

It is expected that about 10,000 delegates will be in Chicago October 6 to 10 for the 35th National Safety Congress and Exposition. More than 200 sessions are scheduled on the programs which have been published.

Sessions will be divided among four hotels. Industrial safety sessions will be held at the Stevens, Congress, and Palmer House, while public safety sessions will take place at the Sherman Hotel.

The meetings of the Paper and Pulp Section will be held at the Stevens. At the first session, which will be held Monday afternoon, awards in the Paper Industry Safety Contest will be presented. Regular meetings of the Section are scheduled for Tuesday, Wednesday, and Thursday afternoons. The Thursday afternoon session will be unique in that four round table discussions will be held in separate rooms on specific questions: (1) Woods and Logging Operations; (2) Pulp Mills and Wood Yards; (3) The Paper Mill; (4) Paper Products Manufacturing. There will be a dinner-business meeting of the Section on Tuesday evening.

The annual banquet of the Congress will be held Wednesday evening, October 8, in the Grand Ballroom of the Stevens Hotel. Guest speaker at the banquet will be Dr. Ralph W. Sockman, minister of Christ Church, New York City, who is known to many radio listeners. He will speak on the subject "Values in the Safety Movement."

◆

INDUSTRIAL SAFETY COURSE OFFERED TO PERSONNEL OF KALAMAZOO AREA THIS FALL

A course of 12 lessons in industrial safety has been arranged by the Kalamazoo Industrial Safety Club as part of its fall and winter program. It is planned, David Cronkite, club chairman, says, to offer the course to safety and supervisory personnel of industries in the Kalamazoo area, in cooperation with the Kalamazoo Safety Council's program.

The course will consist of films, lectures, and discussions on the major phases of safety in manufacturing and processing plants. Mr. Cronkite, Sutherland Paper Company, has been assisted in assembling and arranging the material for the course by James Stone, St. Regis Paper Company; Donalt Stilson, Allen Electric and Equipment Company, and Donald Robart of the Michigan department of labor and industry.

It is planned to begin the course early in the fall to run throughout the winter. Starting date and the place of the course will soon be announced.

◆

KVP AWARDS SAFETY HONORS

Safe driving pins and citations were presented by officials of the Kalamazoo Vegetable Parchment Company (Kalamazoo, Mich.) to Edward DeVries and Hemmo Mejeur for a record of 29 years of driving without an accident.

Both men have driven the KVP panel-type trucks in city deliveries and errands in all kinds of weather. In their "long-distance" safe driving record they have amassed a total of more than 1,000,000 miles of truck driving for KVP. Counting their own private automobiles, this would add a few hundred thousand additional miles.

Cards and pins also were presented to a number of other company drivers by KVP.

SAFETY CONTEST SCORES

The annual contest for 1946-1947 among mills in the Paper and Pulp Section of the National Safety Council closed June 30.

Due to the fact that all reports must be in before final scores can be published, additional time is needed to figure scores following the close of the contest. Therefore, the final scores, as of June 30, were not ready when this issue went to press.

Watch this section for closing figures on the contest.

Keep an Eye ON INGACLAD

Designing new products? Modernizing your plant? Planning on new equipment? Keep an eye on the uses of IngAclad—the low-cost Stainless-Clad Steel with dozens of applications in industry today.

With its 20% cladding of solid stainless steel, IngAclad offers maximum contact-side stainless protection at minimum cost.

On-the-job-proved by 14 years of continuous service.

Originated and produced by

INGERSOLL *Steel Division*
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Plants: Chicago, Illinois
New Castle, Indiana
Kalamazoo, Michigan

NAMES in the News

PERSONALS

WEYERHAEUSER CO. NAMES RAYMOND BAKER MANAGER OF ITS LONGVIEW MILL

Raymond E. Baker, of Plattsburg, New York, has been appointed as mill manager of the Longview (Wash.) mill of the Pulp Division of the Weyerhaeuser Timber Company. Mr. Baker has been employed for the past two years in the Pulp and Paper Division of the Diamond Match Company with offices in Plattsburg. His principal responsibilities with this company have been the supervision of rebuilding and starting up of its sulphite pulp mill at Ogdensburg, New York.

From 1941 to 1945, Mr. Baker was sulphite superintendent for the Munising Paper Company, Munising, Michigan. Prior to that, he was employed by the Brown Company of Berlin, New Hampshire. In this position Mr. Baker had considerable experience in the manufacture of bleached sulphate pulp, and the experience gained in these various connections should give him a well-rounded background for his duties with the Weyerhaeuser Timber Company. He will assume his new position about November 1.

Mr. Baker is a graduate of DePauw University and of the Institute of Paper Chemistry at Appleton, Wisconsin.

◆

HERBERT ROWE APPOINTED NEW RESEARCH DIRECTOR OF NEKOOSA-EDWARDS CO.

Former assistant research director of the Nekoosa-Edwards Paper Company (Port Edwards, Wis.), Dr. Herbert W. Rowe, has been appointed research director to replace Dr. R. C. Crain who is new technical superintendent of the Nekoosa paper mill.

Dr. Rowe received his A.B. degree from Wabash college in 1936 and did post graduate work at Purdue University. He was awarded a Master of Science degree at the Institute of Paper Chemistry, Appleton, in 1938 and his Doctor of Philosophy degree in 1940. He joined the NEPCO technical staff in 1940. From July, 1942, until December, 1945, he served as a chemical engineer at the St. Louis Ordnance plant, returning to NEPCO immediately after the completion of these duties.

◆

▶▶▶ The position of superintendent of the finishing department of the Hammermill Paper Company (Erie, Pa.), vacated by the retirement of Percy Wilson, will be filled by *Robert S. Young*. Mr. Young has been with the company thirty years, serving as assistant superintendent of the paper mill division for the last two years.

◆

A. P. MITCHELL ELECTED VICE PRESIDENT OF THE RIEGEL PAPER CORPORATION

The election of A. P. Mitchell as a vice president of the Riegel Paper Corporation, New York City, has been announced by John L. Riegel, president.

A. P. Mitchell

With Riegel for 24 years, Mr. Mitchell succeeded Paul R. Bachman as general sales manager in 1946. Mr. Bachman retired as a vice president of the company on July 1, 1947.

Mr. Mitchell joined the company in 1923 as a clerk in the order department, and in 1926 was advanced to the position of a salesman. He was appointed sales manager of the coating and converting divisions in 1934, and nine years later he became assistant sales manager. He served in that capacity until he was appointed to succeed Mr. Bachman in 1946.

◆

GLIDDEN CO. ANNOUNCES THREE EXEC. PROMOTIONS

The appointment of Paul E. Sprague, vice president of The Glidden Company, Cleveland, to the position of assistant to the president was announced by Dwight P. Joyce, president. John P. Ruth, a director of the company and general manager of its chemical and pigment division, and Ralph G. Golseth of Chicago, former assistant vice president were elected vice presidents at a meeting of the board of directors, August 8.

Mr. Sprague, who is also director and a member of the company's executive committee, joined The Glidden Company as a chemical engineer in 1915. He has served in nearly all divisions of the company and, as assistant to the president, will continue to supervise the merchandising of lecithin, hormones, and other products of the fine chemicals department of the soya products division.

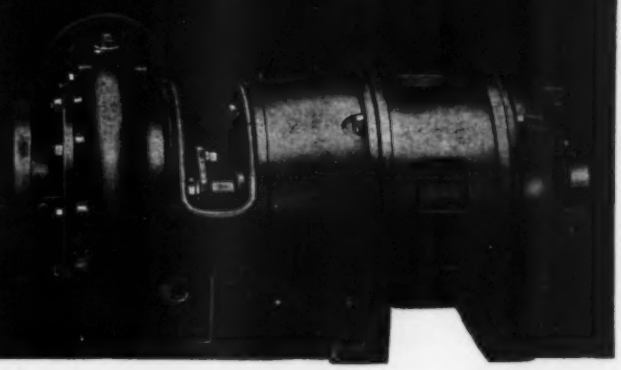
Mr. Ruth began his career with Glidden in 1927 as a chief chemist. He will remain in charge of the chemical and pigment division. Mr. Golseth joined the company two years ago with the title of assistant vice president to aid Mr. Sprague in the soya products division. As vice president he will assume full responsibility for the soya products division and will maintain his office at the soya processing plant in Chicago.

◆

▶▶▶ Several changes in territorial coverage have been announced by the Industrial Division of Nopco Chemical Company (Harrison, N. J.). *Frank J. Chadwick* will service the accounts of both Nopco and Metasap Chemical Company throughout Wisconsin, Minnesota and North and South Dakota, replacing *Edson K. Rice* who recently retired. *Thomas J. Campbell* will handle the accounts in Manhattan formerly handled by Mr. Chadwick. *John J. McCloskey, Jr.*, has been assigned the Long Island, Brooklyn and Queens territory.

Goulds announces..

NEW "CLOSE-CUPLD" CENTRIFUGAL PUMPS

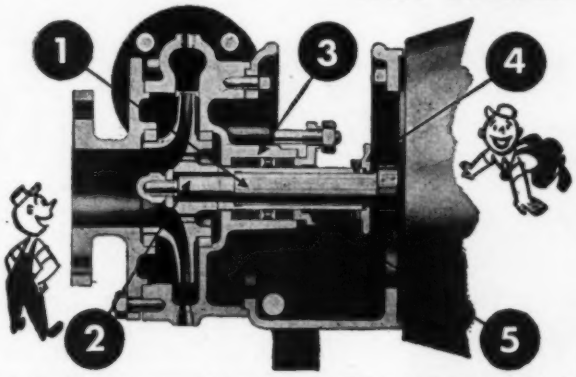


17 sizes... Capacities up to 2000 GPM ...for almost any service!

Drawing upon 100 years of pump design and manufacture, Goulds presents a new line of "Close-Cupld" Centrifugals which give you improved pumping efficiency, simpler maintenance and longer life. Through standardization, wearing parts are interchangeable for pumps of varying sizes. This minimizes spare parts, an important advantage where various size pumps are operating.

Designed for a broad range of service, the field for these new Goulds "Close-Cupld" Pumps is almost unlimited. With heads up to 400 feet, depending on capacities, there is a "Close-Cupld" Pump for almost every condition. Pump and motor are combined in a single, compact assembly, ready to install and operate in any position except vertically with motor below pump.

WHY NEW GOULDS "CLOSE-CUPLD" LAST LONGER



1. Shaft sleeve covers full length of shaft . . . compression seals between shaft sleeve and impeller hub and sleeve and shoulder on shaft completely protects shaft from liquid damage—prolongs life of pump and motor.

2. Unlike most pumps, shaft sleeve is free to expand or contract with temperature changes—prevents buckling and distortion.

3. Machined stuffing box designed for *die-formed*, semi-metallic packing or mechanical seal without necessity of making changes . . . gives you operating flexibility.

4. Liquid deflector, mounted on end of shaft sleeve, is drilled and tapped so that in servicing pump it can be used to prevent shaft rotation while removing or tightening impeller nut; also, to remove sleeve... a time saver.

5. New split gland simplifies repacking of stuffing box, when necessary, another time saver.

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the PUMP FOR the JOB

ROY P. WHITNEY NAMED RESEARCH ASSOCIATE AT PAPER CHEM. INSTITUTE

Dr. Roy P. Whitney, formerly of the University of Maine, joined the staff of The Institute of Paper Chemistry on September 1. Dr. Whitney will have the rank of research associate and will engage in teaching and research work.

Dr. Whitney received his degree of Bachelor of Science, Master of Science, and Doctor of Science in Chemical Engineering from Massachusetts Institute of Technology. He was assistant director (1936-1938) and then director (1938-1942) of the Bangor, Maine, Station, School of Chemical Engineering Practice, of M.I.T., where he was in charge of the program of plant development work and its relation to plant operation, his special interest during this time being in the field of pulp and paper manufacture. From 1942 to 1945, he was assistant professor of Chemical Engineering at M.I.T. but was on full-time loan to the Development Laboratory of the Chemical Warfare Service. For one year, he was in charge of a chemical engineering pilot plant development program; later, he was technical adviser to the C.W.S. program and editor of publications.

Following the war, Dr. Whitney was director of the Department of Industrial Co-operation and also professor and acting head of the Department of Chemical Engineering of the University of Maine at Orono. During this time he was responsible for the development and direction of a program of industrial co-operation, as well as being engaged in teaching, research, and administration of the Chemical Engineering Department.

Dr. Whitney is a member of the Technical Association of the Pulp and Paper Industry, the American Chemical Society, and the American Institute of Chemical Engineers, and is the author of several papers in the general field of pulp and paper manufacture.

◆

▶▶▶ The promotion of *Mark Hamlin*, a member of the Woods Department at the Brown Company, Berlin (N. H.), since 1943, to chief of the purchasing department for market pulpwood has been announced. In the Woods Department, *Bernard Faunce* has been placed in charge of publicity and advertising, and *Lawrence Conway* has been named training officer. *Burton Corkum*, safety engineer, has been given the additional duties of assisting Mr. Faunce in connection with the publicity program.

▶▶▶ Eastman Kodak Company has announced the appointment of *Dr. Cyril J. Staud* as new director of the Kodak Research Laboratory. Dr. Staud joined Kodak in 1924. He worked at Kodak Park first as a chemist and later as a research supervisor on cellulose acetate and cellulose derivatives in the laboratory's department of organic chemistry. In 1931, he was appointed head of the emulsion research laboratory which was newly organized that year. Since 1943, Dr. Staud has served as acting director of the research laboratory in the absence of Dr. Mees.

◆

DAVID HOPKINS NAMED EXEC. VICE PRESIDENT BY R-S PRODUCTS CORP.

The promotion of David W. Hopkins to executive vice president with full administrative authority in the valve, furnace, and manufacturing divisions has been announced by the R-S Products Corporation, Philadelphia.

David W. Hopkins

Mr. Hopkins has been with the corporation since 1939 and recently was in charge of the valve division. Earlier he served as consulting engineer and vice president of V. E. Montgomery Company, Cincinnati. A graduate of the University of Pennsylvania, he did extensive research there which resulted in many basic advances in valve construction and performance.

◆

▶▶▶ A general readjustment of the industrial division of the National Gypsum Company, Buffalo, has resulted in the promotion of *William U. Townsend* to the position of assistant manager of the division and *Douglas H. Shearer* to eastern district industrial sales manager.

HUTCHISON NAMED SUPT. OF COLUMBIA CHEMICAL DIV. & SOUTHERN ALKALI

The appointment of Robert L. Hutchison as general superintendent for Pittsburgh Plate Glass Company's Columbia Chemical Division and for the Southern Alkali Corporation has been announced. He has served as superintendent of Columbia's huge alkali producing plant at Barberton, Ohio, during the past seven years.

Mr. Hutchison joined the firm in 1925 as a draftsman in the engineering department, and six years later he was placed in charge of all maintenance and construction, a position he held until his appointment as plant superintendent in 1940. His headquarters will be at the Columbia Chemical Division offices, Fifth Avenue and Bellefield Street, Pittsburgh.

◆

▶▶▶ The managing director for Baumgartner & Cie Ltd. of Lausanne-Zurich, Switzerland, *Rudolf P. Walty*, is now in the United States on an educational business trip through American paper mills. Representing an old, established firm, he intends to contact paper mills which intend to extend their business to the Swiss paper market, and to visit especially those mills which produce fine printing papers, glassine, and wrapping papers in rolls and sheets. Those desiring may contact him c/o Arnhold & S. Bleichroder, Inc., 30 Broad St., New York.

◆

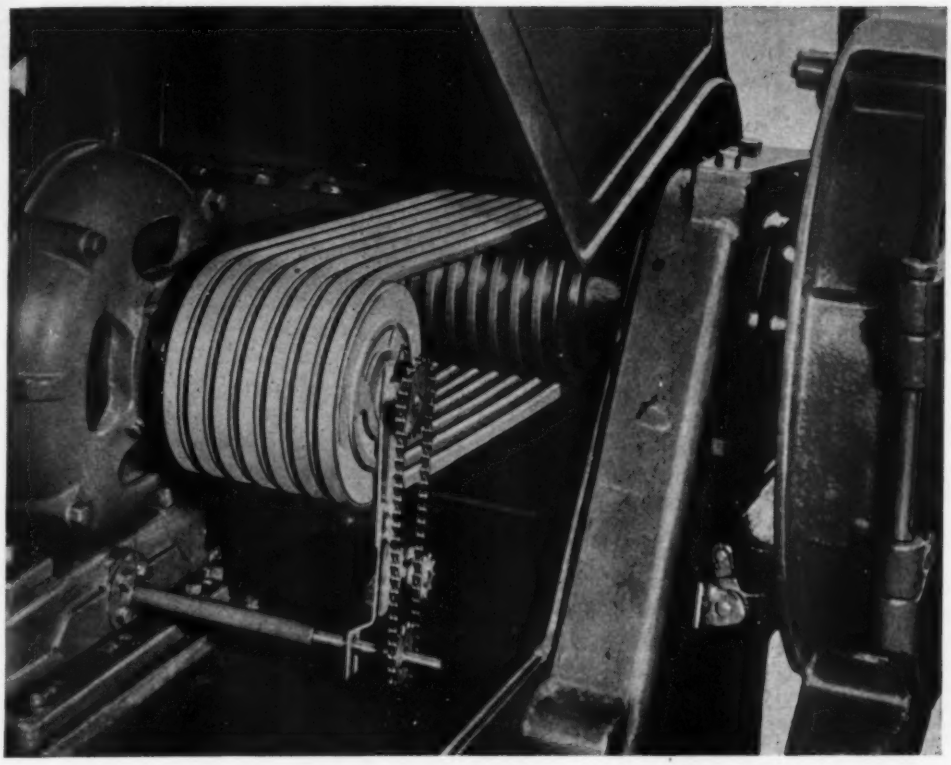
▶▶▶ District manager of southern California and Arizona for the De Laval Steam Turbine Company, Trenton (N. J.), will be *Harvey A. Mylander* with offices in Los Angeles. He formerly was associated with the General Electric Company and the American Hoist and Derrick Company, and had spent several years as sales engineer for the International General Electric Company in Venezuela.

◆

▶▶▶ General manager of the Tacoma mill and folding carton plant of Container Corporation of America, *George S. Ripley*, has been named general manager of the Seattle plant and head of all operations in the Pacific Northwest area. At the Seattle plant he succeeds E. J. Nugent who has retired. Mr. Ripley formerly was president of the Union Paperbox Company.

◆

▶▶▶ The appointment of *Lester M. Reiss* to the E. P. Lawson Company's New York sales staff has been announced. Prior to his discharge, Mr. Reiss was head of the competitive athletic program for the U. S. troops in



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These flexible drives use economical constant speed motors. They provide infinite speed variations within their ranges—quickly, easily, accurately.

Vari-Pitch sheaves using A, B, C, D or E belts are available for stationary or motion control, with range up to 25% per sheave; *Vari-Pitch* sheaves using Q or R wide belts allow variations up to 100%; *Vari-Pitch* speed changers permit ranges up to 375%. There are types and sizes to suit all needs, from fractional to 300 hp!

Texrope offers the *most complete* line of variable speed drives made ... engineered and built by Allis-Chalmers, originator of the multiple V-belt drive. See Sweet's Catalog, or call your nearby A-C office or dealer for Bulletin 20B6051G. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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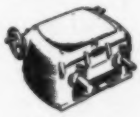
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



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Speed variations up to 375% at the turn of a crank.

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Finest V-Belt engineering talent in the world—at your call.

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One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

Europe. In his present sales-service work, he will be a representative in the New York area for Lawson paper cutter, multiple head drilling machines, PMC die cutting machines, Champion wire stitchers, Southworth machines, and Hobbs die presses.

◆

OHIO INJECTOR HONORS EMPLOYEES HOLDING LONG SERVICE RECORDS

At a service celebration attended by more than 120 employees having twenty or more years of service at The Ohio Injector Company, Wadsworth, Ohio, J. C. Waltz was given a government savings bond in recognition of his 52 years of service. He was ushered into the 50-year club by recently retired Lloyd Hartzell, who had a 53-year service record.

Traditional wrist watches were given to George Meager, Pete Kiefer, and Floyd Shook who had served forty years with the company. Twenty-year and thirty-year employees were also given awards.

◆

▶▶▶ The resignation of *Arnold Brown,* manager of the Pump Division of Fairbanks, Morse & Company, Chicago, has just been announced. *L. A. Weom,* manager of the Pump and Electric Department of the company's St. Paul Branch, has been appointed to succeed Mr. Brown. With the exception of 3½ years spent in service during the recent world war, Mr. Weom has been with the F-M Company since 1929.

◆

▶▶▶ The American Car and Foundry Company has announced that *Henry V. Bootes,* former sales agent for the company, has been appointed district sales manager for the New York district. Mr. Bootes was previously associated with The Ohio Injector Company as district manager.

◆

▶▶▶ New director of sales of the Southern Alkali Corporation, a subsidiary of Pittsburgh Plate Glass Company, will be *E. Wayne Haley,* assistant director of sales during the past twelve years. Mr. Haley succeeds Eli Winkler who will continue with the firm in the capacity of sales consultant.

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▶▶▶ The recent appointment of *Frank Hayes* as sales manager and *George Eckweiler* as assistant sales manager has been announced by the Noble & Wood Machine Company. Mr. Hayes has been associated with the company since 1921, and in that time he has been employed in the shop, cost accounting, engineering, and sales departments. He has represented his company in the paper field for 20 years and has a wide acquaintance among paper mill men. Mr. Eckweiler has been in charge of advertising and export sales for this company for the last ten years.

Wayne Young, President of The Ohio Injector Co., is shown presenting a government savings bond to J. C. Waltz, long-service employee, while Lloyd Hartzell, recently retired employee, welcomes Mr. Waltz into the 50-year Club. Mr. Hartzell had 53 years of OIC service, while Mr. Waltz has 52 years at OIC

◆

▶▶▶ The Kellogg Division of American Brake Shoe Company has announced the appointment of *Selby F. Greer* to the position of general sales manager. Mr. Greer has served in various sales capacities since joining the company and will continue at the main plant in Rochester, New York. *H. O. Holland,* vice president and former general sales manager, will assume new duties.

◆

▶▶▶ The board of directors of The Crystal Tissue Company (Middletown, Ohio) has made the following appointments: *George B. Tyler,* head of the cost department, will be assistant secretary: *Calista Van Horn* has been appointed assistant treasurer; and *W. Homer Boxwell* assumes the duties of office manager in addition to his work as purchasing agent.

◆

▶▶▶ A number of the general engineering staff of Link-Belt Company at Philadelphia, *Albert Muschoot,* has been appointed assistant to the chief engineer, with headquarters at the company's general office, 307 N. Michigan Ave., Chicago. In this capacity, he will be directly responsible to Richard F. Bergman, Link-Belt vice president and chief engineer.

▶▶▶ With his headquarters in Chicago, *J. G. Green* is now serving as midwestern representative for the Baker Industrial Truck Division of Baker-Raulang Company, Cleveland. In 1935, Mr. Green established the J. G. Green Company in Pittsburgh. He later served as assistant sales manager of the Louis Allis Company, Milwaukee, and for the past five years as assistant general manager of the Philco Storage Battery Division (Trenton, N. J.)

◆

▶▶▶ A member of the Chicago sales force of American Writing Paper Corporation (Holyoke, Mass.) for 28 years, *Creight W. Whiting,* recently joined the W. S. Hamilton & Sons Paper Company, Miquon (Pa.). He will be associated with the Chicago sales office of the Hamilton organization.

◆

▶▶▶ *Richard E. Harren* has joined the Resyn department of National Adhesive, New York City, as a chemist. He is a graduate of Queens College with post-graduate work in chemistry at Columbia University. Mr. Harren was a navigator in the AAF for three years during World War II.

◆

▶▶▶ The selection of *Dr. Wendell W. Moyer* as director of research for the Crown Zellerbach Corporation (Camas, Wash.) was announced recently by William R. Barber, director of the central technical department. Dr. Moyer was director of research for the A. E. Staley Manufacturing Company for ten years.

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ARE FILLED PROMPTLY FROM STOCK

Widespread use of small, lightweight Ross "BCF" oil and water coolers for Diesels, compressors, hydraulic presses, torque converters, reduction gears and turbines REQUIRES MASS PRODUCTION OF PARTS AND ASSEMBLY LINE METHODS to keep current with the needs of industry.

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Division of American Radiator & Standard Sanitary corporation

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Ross Equipment Is Manufactured and Sold in Canada by Horton Steel Works, Ltd., Fort Erie, Ontario

▶▶▶ The promotion of *Edmond B. Hollingsworth*, manager of the National Gypsum Company's York Pa., plant since September, 1945, to the new position of assistant production manager of the company with headquarters in Buffalo, has been announced. In his new position, Mr. Hollingsworth, who has been with the company since 1936, will assist in the administration of its production program in all plants. He has been succeeded as manager of the York plant by *William W. Wallace*, of Chicago.

◆

▶▶▶ Former assistant to the vice president in the New York sales office of ACF, *Frederick H. Eaton*, has been appointed assistant vice president of American Car and Foundry Export Company, New York.

◆

▶▶▶ Promotion of *Harold A. Hintz* to Pacific coast sales manager has been announced by the H. K. Porter Company, Inc., Pittsburgh. Mr. Hintz will direct the activities of all Porter sales offices on the Pacific coast. Also announced is the appointment of *J. F. Morley*, as district sales engineer on the Pacific coast.

◆

▶▶▶ The appointment of *J. T. Whelan* as chief engineer and *C. G. R. Johnson* as assistant chief engineer has been announced by the Kimberly-Clark Corporation (Neenah, Wis.). Mr. Whelan succeeds C. W. Nelson who has been named manager of the corporation's expansion program.

◆

▶▶▶ The appointment of *Joseph M. Weldon* as assistant to Vice President H. J. French has been announced by the International Nickel Company, Inc. Mr. Weldon has been associated with the company since 1927.

◆

▶▶▶ The new purchasing agent for the Hyster Company, Portland, Oregon, is *Paul Rhodes* who was employed in co-ordinating and expediting of materials in the company's Chicago office since 1945.

◆

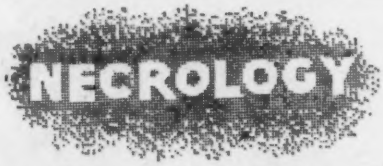
▶▶▶ The appointment of *Lewis M. Bound* as West coast manager of Tube Turns, Inc., with headquarters in San Francisco, has been announced. Mr. Bound joined the Tube Turns' New York office sales staff in July, 1941.

◆

▶▶▶ A member of the firm since 1906, *C. W. Harrold*, has been elected vice president in charge of engineering and development for the Harris-Seybold Company, Cleveland. While serving as chief engineer of the Harris division since 1919, Mr. Harrold had collaborated with the late A. Stull Harris, president of the company (see Necrology), in many projects in offset press designs, including the development of the first four color offset press in 1931.

◆

▶▶▶ As account executive in charge of market research, *John R. Skeen* joined the staff of Foster D. Snell, Inc., consulting cheemists and engineers, New York, on September 1. Dr. Skeen comes to the Snell organization from the staff of the Bureau of Internal Revenue. Since 1945, he has been principal chemical engineer in the Business and Industries Division of the Bureau's Income Tax Unit, where he acted as consultant to the field divisions in the examination of claims of chemical companies for relief from excess profits taxes. He is a member of the American Chemical Society.



GEORGE H. POUNTAIN

A well-known paper mill superintendent, George H. Pountain, passed away at Glens Falls, New York, on August 15. He was 67 years of age.

Mr. Pountain was general superintendent of the Hudson River mill of International Paper Company, Corinth, New York. He had been connected with that company at Corinth for the past fourteen years.

Prior to his connection with the International Paper Company, Mr. Pountain was mill superintendent at the Bryant Paper Company, Kalamazoo, Michigan. He also had the same position with Monarch and King mills of the Allied Paper Company.

Born in England in 1880, Mr. Pountain came to Kalamazoo as a youth. He was well known throughout the industry. He was a member of the American Pulp and Paper Mill Superintendents Association.

Survivors include the widow, two daughters and two sons.

◆

ARTHUR G. READY

Paper mill engineer, Arthur G. Ready, passed away at Savannah, Georgia, August 15, at the age of 51.

Last spring, Mr. Ready became associated with the Kraft Pulp and Board Division of the National Container Corporation, Jacksonville, Florida. At that time, it was stated he would act as mill development engineer to aid in the planning and developing of a further expansion program.

Just prior to his connection with National Container, Mr. Ready had been with Cia Industrial de Atenquique, S. A., in Mexico during the construction of that kraft pulp and paper mill. His previous record included a long list of prominent paper manufacturers: Everett Pulp and Paper Company (Everett, Wash.); Brown Paper Mill Company (Monroe, La.), Robert Gair Company (Northern mills), Southland Paper Mills, Inc. (Lufkin, Texas), St. Marys Kraft Corporation (St. Marys, Ga.), Rayonier, Inc. (western mills and Fernandina, Fla.).

He is survived by his widow.

◆

ALFRED S. HARRIS

President of Harris-Seybold Company, Cleveland, and son of its founder, Alfred S. Harris, passed away August 26. He was 56 years of age.

Mr. Harris joined the company in 1912 as a draftsman in the engineering department. For 35 years he worked closely with Charles W. Harrold, now vice president in charge of engineering, and was responsible for many of the important developments in offset lithographic press design.

In 1944, Mr. Harris became president of the company. His interest in research led him to devote considerable time to the Lithographic Technical Foundation, of which he was a director at the time of his death. He also held a number of important patents related to the graphic arts.

Mr. Harris established a laboratory at the company's plant for research in the chemistry of lithography, which is one of the finest in this country.

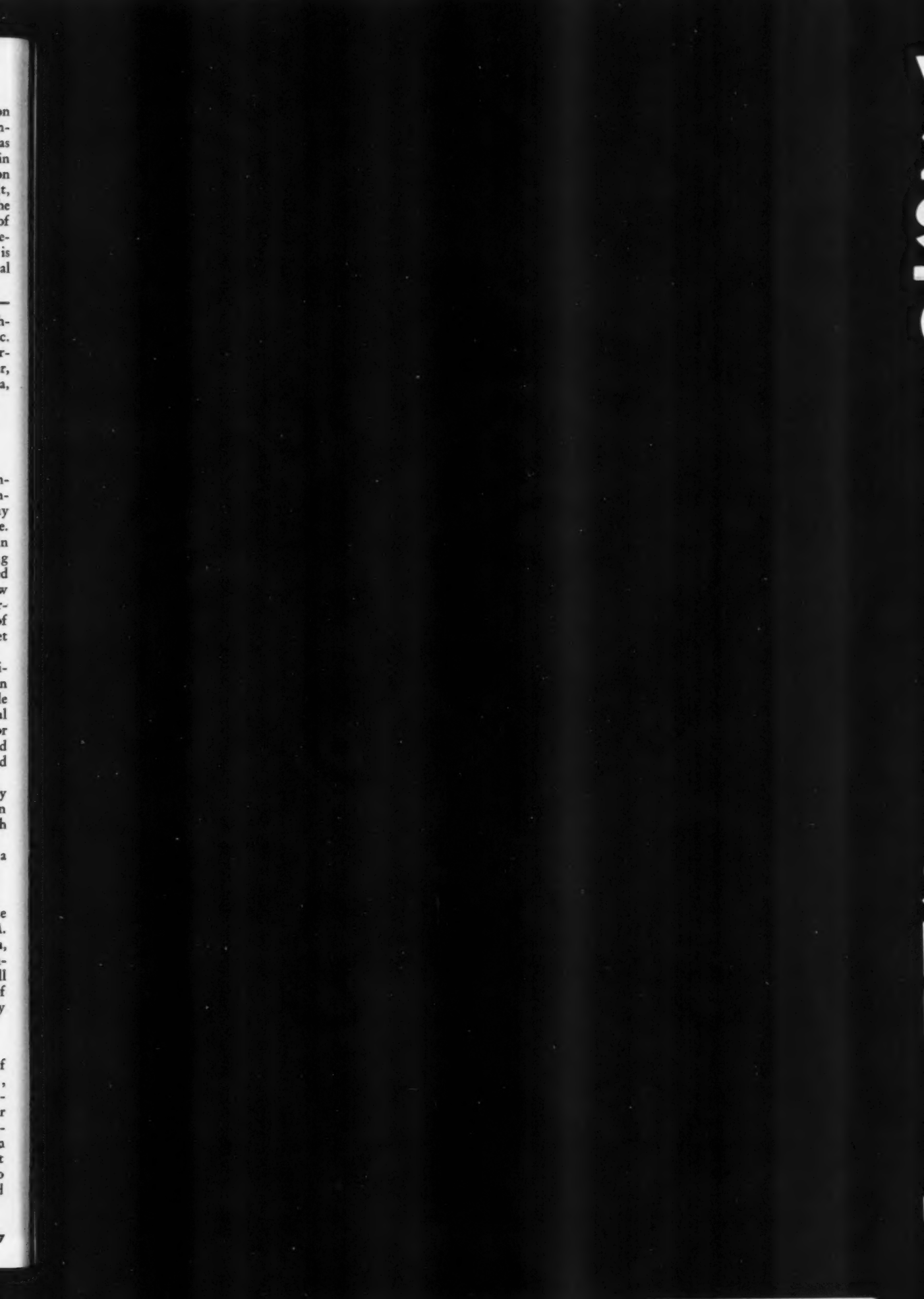
Survivors include the widow, a daughter and a son.

◆

▶▶▶ A veteran paper mill executive of northern New York, *Walter A. Elliott*, passed away recently in Leonia, New Jersey. He formerly was superintendent of the Island Paper Co. mill and later was night superintendent of the National Paper Products Company plant. He was 74 years of age.

◆

▶▶▶ General production manager of the Hyster Company (Portland, Ore.), *Maurice Hooff*, 47, passed away August 22. Connected with the Hyster company since its first day of operation, he had raised the production figures of both the tractor equipment and the industrial truck divisions to extremely high totals. His widow and two sons survive.

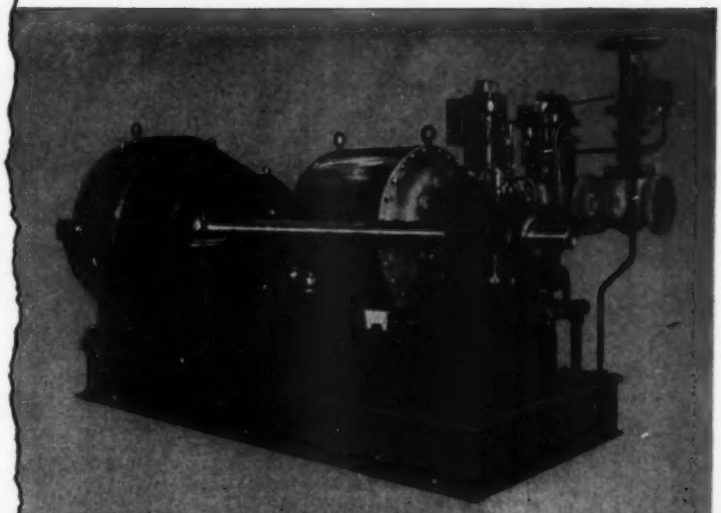


ELIMINATE SPEED FLUCTUATIONS

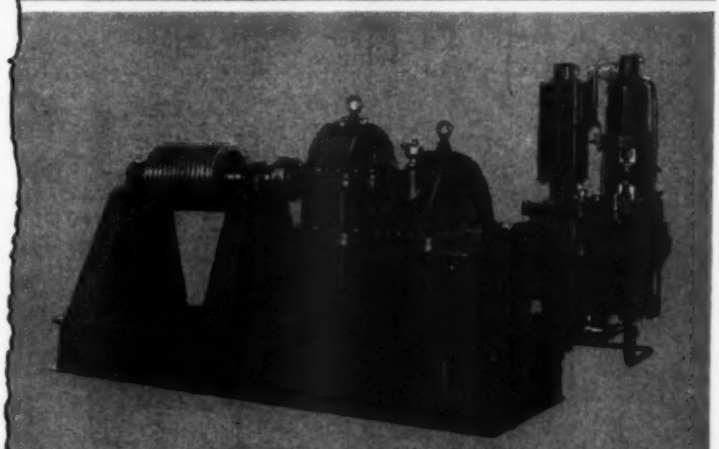
with Worthington Paper Machine Drives

Continuous steady speed operation invariably follows when Worthington Steam Turbines take over the driving job The isochronous governor assures no change in operating speed from minimum to maximum load for any given control setting A special single-seated governor valve or valves give stable operation at low loads. In addition, the governor is adjustable over complete range to accommodate any paper machine requirement — remote speed controls can be provided if desired. Turbine-driven auxiliary oil pump protects against shutdown from power failures.

Whether your conditions call for automatic or hand nozzle control, direct connection or belted to line shaft, you can depend on Worthington to manufacture a smooth-running, economical steam turbine for any size of paper or board machine. Call your nearest Worthington office for more information proving that — in steam turbines as in so much other equipment — *there's more worth in Worthington*. *Worthington Pump and Machinery Corporation, Steam Turbine Division, Wellsville, New York.*



Worthington Steam Turbine with double extended gear shaft for direct connection into the line shaft of a large paper machine



A small Worthington paper machine drive unit for belting to drive shaft

WORTHINGTON

T7-4

A GREAT TEAM IN STEAM

TIGHT VALVES *Save Fuel!*

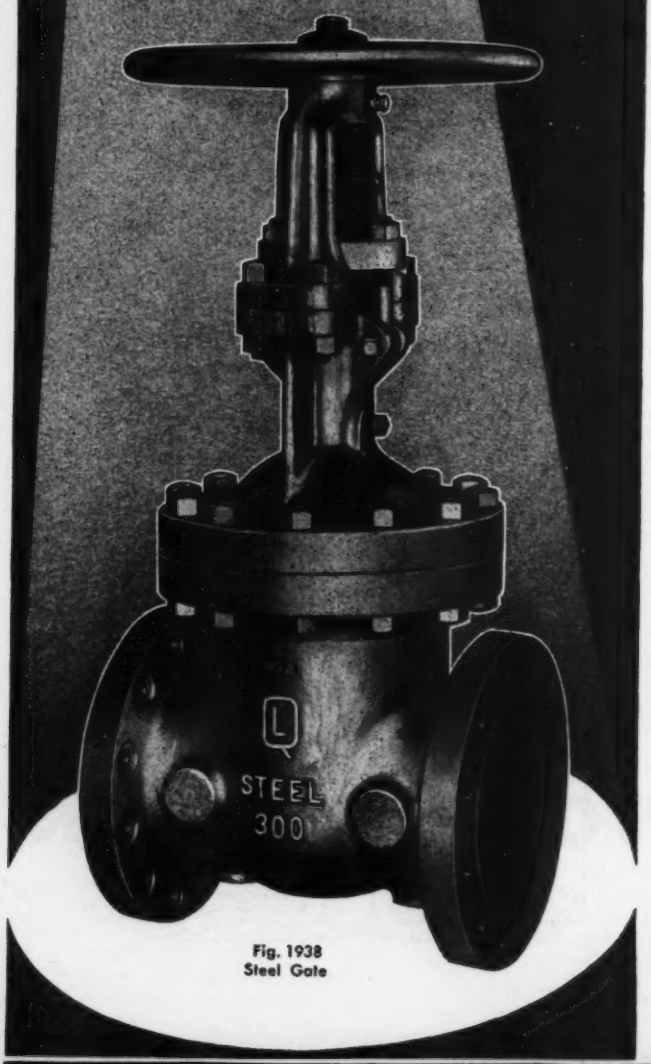


Fig. 1938
Steel Gate

VITALLY IMPORTANT—*for keeping*
PRODUCTION *Up*
• • • • COSTS *Down*

Many elements in a piping system may contribute to ultimate fuel waste. Insulation may be inadequate. Piping and fittings may be at fault. Or valves may fail to hold tight . . . resulting in leakage of steam, air, or water, and in lowered pressures, all of which may mean excessive fuel consumption.

Lunkenheimer Valves—whether of steel, iron, or bronze—are quality built to stay tight, over years of service. They afford constant, dependable protection against leakage. Simplicity of design and a minimum of working parts assure extra long life and easy, economical maintenance.

We have prepared a chart, showing in dollars-and-cents figures, what leaky valves can waste in steam, water, and air. For a copy, write—**The Lunkenheimer Co., Cincinnati 14, Ohio. U. S. A.** New York 13, Chicago 6, Boston 10, Philadelphia 34. Export Dept. 318-322 Hudson St., New York 13, N. Y.

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is fully equipped to help you solve problems of valve maintenance or operation. Call on him . . . you'll profit from his better valve service!

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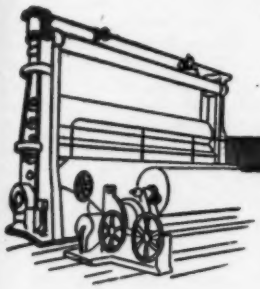
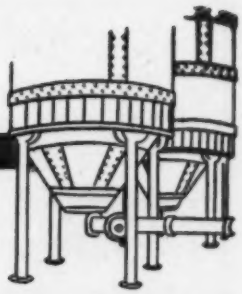
BRONZE, IRON, STEEL, AND CORROSION RESISTANT ALLOY VALVES
AIR DEVICES, LUBRICATORS, AIRCRAFT FITTINGS



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Right and Wrong Ways of Handling Wire Rope

If the wire rope is in coils, do not lay the coil flat and pull the rope from the coil as is shown in Figure 1. This method will produce a spiral effect—many ropes are ruined in this way. The coil should be unrolled like the rolling of a hoop as illustrated in Figure 2, or unreeled from a revolving swift, and straightened out its full length before attempting to pass it around a sheave.

Wire rope received on a reel should be jacked up on a shaft (see Figure 3) or placed on a revolving swift at a point convenient to the installation. It should be set up in an unobstructed path, and as far away as practicable in line with the drum, so that it can be pulled off straight. The rope should be pulled slowly off the reel. It is always advisable to keep the rope taut, and to accomplish this a timber brake placed against the flange of the reel (as shown in Figure 3) will provide the necessary back tension. This will insure snug and uniform winding when transferring the rope directly to the drum. Figure 4 shows the wrong way to unreel. This produces a spiral effect which remains permanently in the rope. If the rope is pulled off over the sides of the reel as indicated, the result is a kink.

If the drum to which the rope is being wound is not grooved, particular care should be exercised in winding the rope in a true helical spiral, and in doing this it is most important that the proper helix be started. After the proper start is made, each additional wrap around the drum should be lightly driven to position. Care should also be taken to see that the seizings on the other end of the rope are not disturbed while winding.

The correct methods should be strictly adhered to when handling new ropes. Other methods generally result in the spiral condition shown, which in turn usually produces a kink in the rope. A kink may be straightened out, but not without leaving a permanently damaged and weak spot in the rope. Ropes sometimes fail to give the good service they are qualified to give because of damage resulting from careless handling.—JOHN A. ROEBLING'S SON'S CO.

Figure 3 (left), Figure 4 (right)

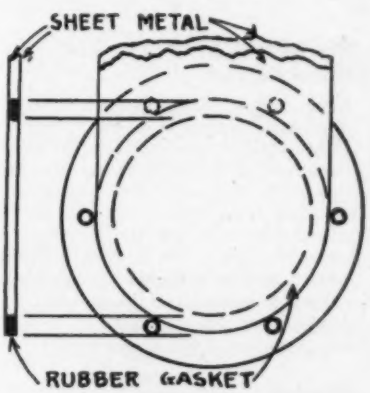
◆

How to Install Gasket Between Flanges Already in Place

The question is often asked, "How can a thin and flimsy gasket be installed between flanges already in place in a pipe line?" The accompanying sketch shows how it has been accomplished successfully on large pipe lines—using thin and flimsy rubber gaskets which otherwise would fold or buckle and cause plenty of trouble.

With the pipe joint to be repaired unbolted and the old gasket removed, the procedure for inserting the new gasket is as follows:

Cut out two pieces of sheet metal as indicated in sketch, one end of each piece being rounded to the exact curvature of the bolt circle (which is the same as the outside curvature of the gasket). Then place the gasket between the two pieces of metal as shown in the sectional view, and insert the assembly carefully between the flanges to the position shown



in sketch. With the gasket in position, carefully withdraw one of the pieces of sheet metal, and then the other, thus leaving the gasket behind in correct position for bolting.

Before placing the gasket between the pieces of sheet metal make certain that no surface is sticky at any point so that the position of the gasket in the flange will not be disturbed when the pieces of sheet metal are withdrawn.—W. F. SCHAPHORST.

◆

How to Chip a Jordan Filling

Uniformity of jordan treatment depends primarily on the distance between the top of the bars and the top of the woods. Therefore, to assist in attaining this uniformity as well as maximum wear

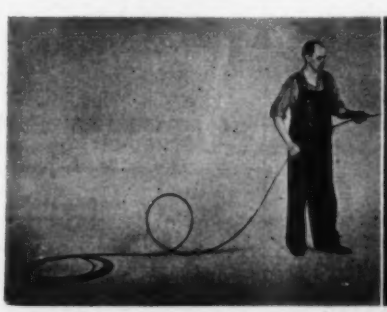
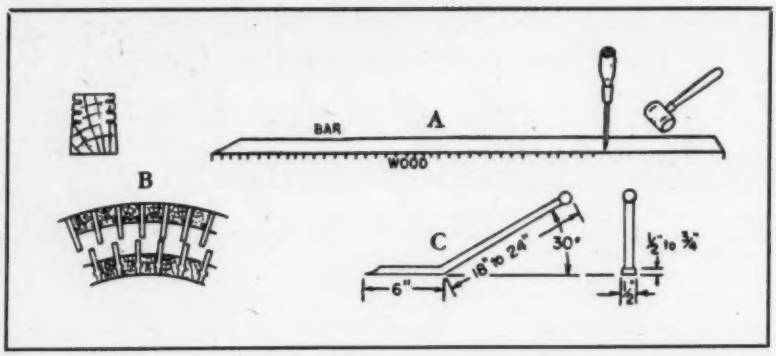


Figure 1 (left), Figure 2 (right)



and service from a jordan, the following suggestions are offered on how to chip a jordan filling:

1. After removing plug from jordan, clean channels between bars. (A wire brush is a handy tool for this operation.)

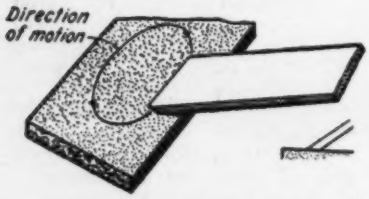
2. Then, using a standard wood chisel, notch down the woods in both the plug and shell (Figure A). The notches should be about ½ in. apart and as deep as necessary. (The shell woods of some jordans as shown in Figure B are scored along their sides to facilitate chipping.)

3. After the notching operation is completed, rip out the wood to the desired depth with a ripper chisel. This chisel (Figure C) can be made from a bar of good steel; and can be used with a hammer by hand, or can be made to fit an air hammer. — THE BLACK-CLAWSON COMPANY.

◆

Sharpening Chisels and Plane Cutters

Plane cutters, chisels, gouges and similar single bevel cutting tools should first be ground square on the carborundum wheel. Check with a try-square, testing from one edge of the tool only. With proper care, the single bevel type of tool need not be ground often. A few minutes spent in honing the tool on the oil stone will keep the cutting edge serviceable. A good general rule to follow is: If the honed part of the bevel exceeds one half of its total length the tool should be reground.



The angle of the bevel varies with the type of work to be performed. A good angle for general work is 25 degrees, soft wood or material is worked with a 20 degree bevel while hard wood requires a 30-degree bevel. Small nicks are removed by flat grinding on a carborundum stone. The bevel of the tool must be exactly parallel with the surface of the stone. Use one hand to guide the tool, the other to apply a moderate amount of pressure and move the tool over the entire surface of the stone with a rotary motion (as illustrated).

Use as small a circle as possible, as this gives better control over the tool. A rocking motion should be avoided, as this soon destroys the hollow grind obtained from the carborundum wheel and makes it practically impossible to sharpen the tool on a flat stone without regrinding. As the cutting edge of the bevel becomes thin, it will be noted that a burr or wire edge is formed on the back of the tool. This is removed by placing the back of the tool absolutely flat on the stone and using the rotary motion as illustrated. Plane cutters usually have a small portion of each end ground off to prevent them from biting into the wood being smoothed. When all nicks have been removed from the tool, hone to the correct cutting edge on the oilstone, using the procedure given above.—Shop Work (TM 11-453) WAR DEPARTMENT TECHNICAL MANUAL.

How to Select Good Operating Current Levels for Use with Tungsten Electrodes in Inert-Arc Welding

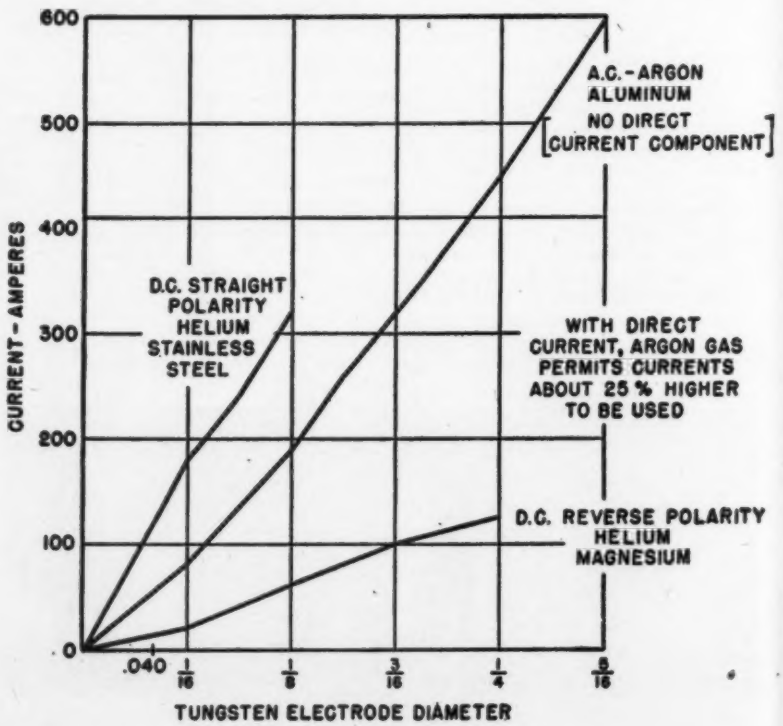
The factors that affect the current carrying capacity of a particular size of tungsten electrode are the electrode extension from the gas nozzle and collet; water cooling, if used, and its distance from the electrode; type and flow of shielding gas; type of joint and material to be welded; and type of welding, whether manual or machine.

With all these factors to consider, and since there is no clear-cut maximum current that can be used with a particular diameter electrode, there is apt to be confusion as to the proper current to use on any diameter tungsten.

The chart shows current levels that have been used for manual welding in the General Electric welding laboratory for several years, and gives current levels for each electrode size. These values are very flexible. Tungsten 1/16 in. in diameter, for example, will operate satisfactorily on straight polarity d-c with helium gas on stainless steel from 100 amperes to 180 amperes.

Below 100 amperes the arc may have a tendency to wander on the electrode tip and be a little wild. Above 180 amperes, the electrode may become molten enough to drop off. This current, however, may be operated very satisfactorily in certain applications. The same is generally true of most other sizes of electrodes.

It is advisable to operate as nearly at the electrode current limit as is possible for each application as this generally produces the most stable arc.—GENERAL ELECTRIC COMPANY.



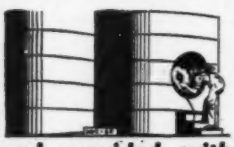
Safe Practices in the Use and Maintenance of Low Voltage Electrical Equipment

Do's

Ground frames of portable electric tools with a third wire (insert A) if tools are not equipped with three wire cord and plug having a third (grounded) connection, as shown in insert B.

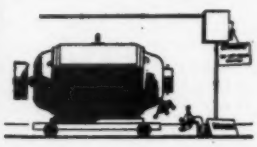
Use extension lights constructed of cord and other materials which are approved and suited to the purpose and the location. Be sure light has an insulated handle.

When working in tanks, boilers, damp places or other locations that are conducting, use extension lights that are constructed of moisture proof wire and non-metallic shell sockets and lamp guards. Use cords connected to 6 volt side of a 110/6 volt transformer and provided with a 6 volt lamp.

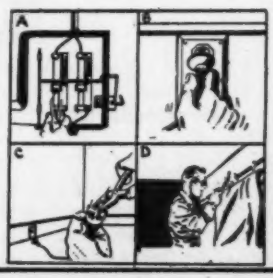


Protect yourself when working on a motor or any electrically driven device by locking, tying or tagging the switch in the open position, and removing the fuses.

Lock supply switch open to de-energize any wires which have to remain unconnected and exposed after electrical equipment has been disconnected. If exposed, separate leads and tape them well, in case some one should close the switch.



(A) When removing fuses, be sure circuit is open and use insulated pliers. (B) Pull on the plug and not on the extension cord when disconnecting an electrical device. (C) Use care when removing the base of a broken lamp from a socket. Make sure circuit is dead. (D) Guard against flash by protecting the other side of the circuit, when it is necessary to work on a live connection.



Don'ts

Don't run the risk of receiving an electric shock in case you should drill into a live wire, or the motor case becomes energized due to an insulation breakdown or other internal failure.

Don't take chances with extension lights connected directly to 110 volt lighting circuits when working where dampness or chemicals may be present, or large body areas, usually sweaty, are in contact with grounded metal surfaces.

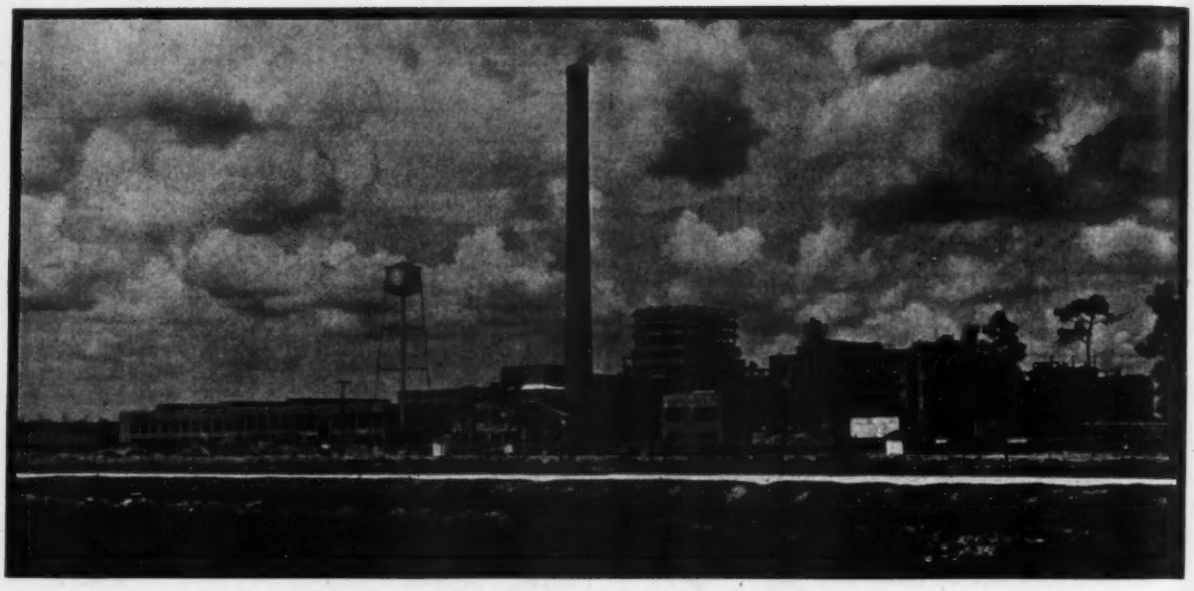
Don't improvise or use makeshift extension lights. Metallic sockets, improper wire and worn insulation increase the hazard of getting a shock.

Don't run the risk of receiving a shock or other injury in case the switch which you have opened to protect yourself should be closed by some one else.

Don't ever leave live connections exposed. They can become a "booby trap" for you or another employee.

Don't work on electrical connections or devices unless you are authorized to do this type of work.

Adapted from Industrial Safety Charts, Series K, U. S. Department of Labor.



View of new Palatka plant looking northeast from entrance road

New Mill at Palatka, Florida

D. G. MOON, Cons. Engineer
J. E. Sirrine & Company

▶▶▶ THE NEW MILL of the Hudson Pulp & Paper Corporation, Southern Division, expected to begin operation early this fall, is located in Putnam County, Florida, approximately two miles north of the city of Palatka on a tract of land comprising four hundred fifty acres, of which fifty acres is fenced in for the mill and its facilities. The site is in a triangular strip between the Georgia Southern and Florida Railway and the Atlantic Coast Line Railway, being served by a connecting spur to both lines.

To provide access to the mill the county has constructed a paved road between County Highway No. 28 and Federal Highway No. 17, a distance of approximately two miles, from which new highway interconnection the mill entrance road has been taken.

The mill faces on Rice Creek, a tributary of the St. Johns River, with a minimum channel depth of twelve feet. The dock facilities provide means for water shipment of incoming and outgoing materials to the port of Jacksonville and other points.

In general, the mill as designed will produce up to two hundred tons per day of high grade kraft, wrapping, gumming, and bag, with facilities for converting same into the finished product; and full provision has been made for adding a future bleach plant or doubling its capacity.

The buildings are of steel frame, concrete foundation, floors, and grade beams, with eight-inch brick curtain walls, treated steel sash, and with a total floor space of two hundred sixty thousand square feet and a building area of one hundred thirty thousand square feet.

All of the heavy foundations are on wood piling driven to below the existing water table.

The roof deck is precast light concrete slabs, overlaid with insulating board where required. Corrugated asbestos siding is used for some of the temporary walls, sheds, and in the canopy or open type construction for the recovery building.

Approximately fifty-four hundred piles, twenty-five hundred tons of steel, sixteen thousand cubic yards of concrete, a million and one-half brick, and seventy thousand square feet of sash were required in the buildings and foundations.

The general facilities provided for the operation of the mill are as follows:

Wood Preparing and Handling

The wood yard is aranged for the storage of a minimum of eight thousand cords received by rail, water, or truck, in such a way that the handling into or out of storage will be within reach of a locomotive crane.

A horizontal steel conveyor with loading skirt parallels the incoming wood track and delivers up an inclined section to one 12-ft. by 45-ft. barking drum, the wood from which drops onto a sorting conveyor for the cleaning or rejection and return of unbarked wood. The pre-

This is an OWEN PULPWOOD GRAPPLE •

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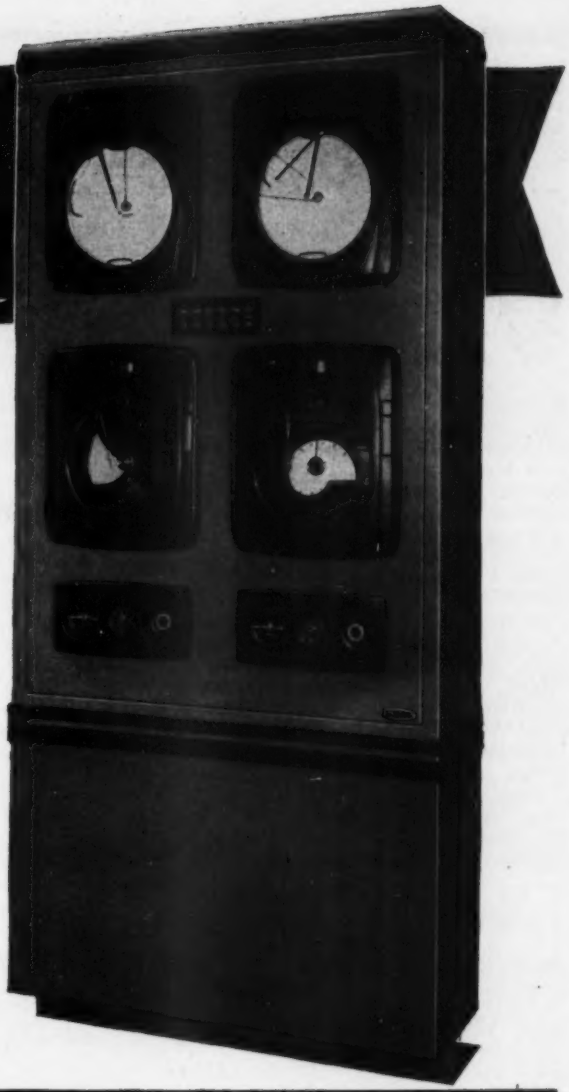
NEW—COMPACT—AUTOMATIC
"PACKAGED" CONTROL UNIT for Sulphite Digesters!



Streamlined Cabinet Equipped With Advanced Foxboro Instrumentation Assures Closer Control in Pulp Cooking.

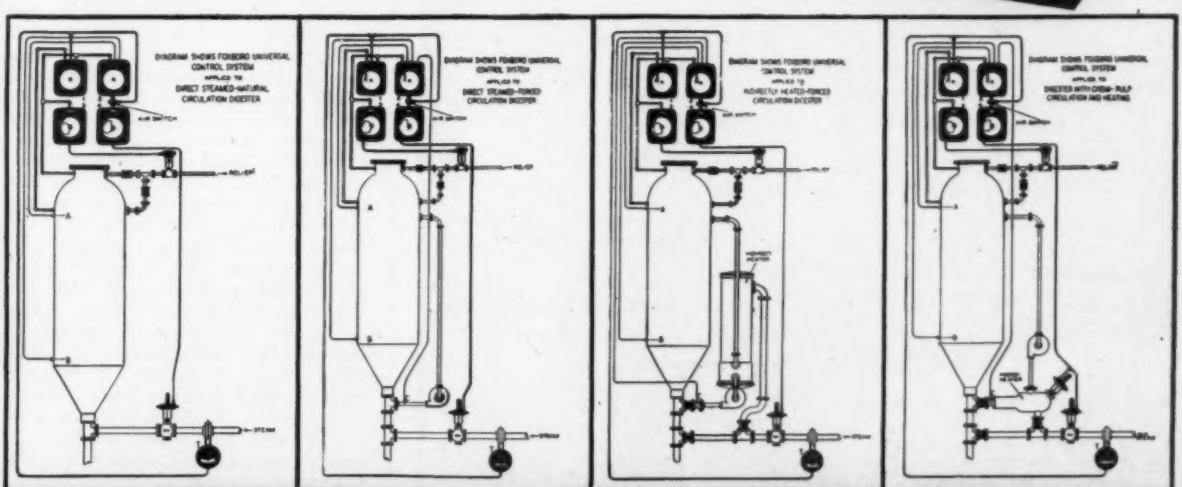
● THE COMBINED PERFORMANCE, convenience, and versatility of this Foxboro development sets a new high in efficiency. It is the result of more than 20 years experience in pulp cooking instrumentation.

Digester heat input and gas relief are automatically regulated by this new unit so that cooking pressure and temperature follow exactly prescribed schedules from start to finish.

This efficient new unit is equally suitable for any type of sulphite digester (see diagrams below).

Get all the facts about this important new development in sulphite digester control. Information also available on similar "packaged" control systems for alkaline digesters. Write the Foxboro Company, 158 Neponset Avenue, Foxboro, Mass., U. S. A. Branches in principal cities.

Foxboro Automatic Digester Control Unit. Supplied complete with following instruments ready-mounted, with wiring and piping completed, in a modern protective steel cabinet: (1) Foxboro Steam Flow and Liquid Level Recorder with Steam Flow Integrator (top left); (2) Foxboro Dynalog (electronic) Three-Point Temperature and Top Pressure Recorder (top right); (3) Foxboro Cam Schedule Pressure Controller (lower left); (4) Foxboro Cam Schedule Steaming Controller (right).



FOXBORO
REG. U. S. PAT. OFF.

AUTOMATIC DIGESTER CONTROL

pared wood is delivered from the end of this sorting conveyor directly into one 88-in. 10-knife chipper and thence onto vibrating chip screens and by a Redler type conveyor to ground storage silos of tile construction. There are three of these silos, 27-ft. diameter by 46-ft. high, which give a 24-hour storage capacity.

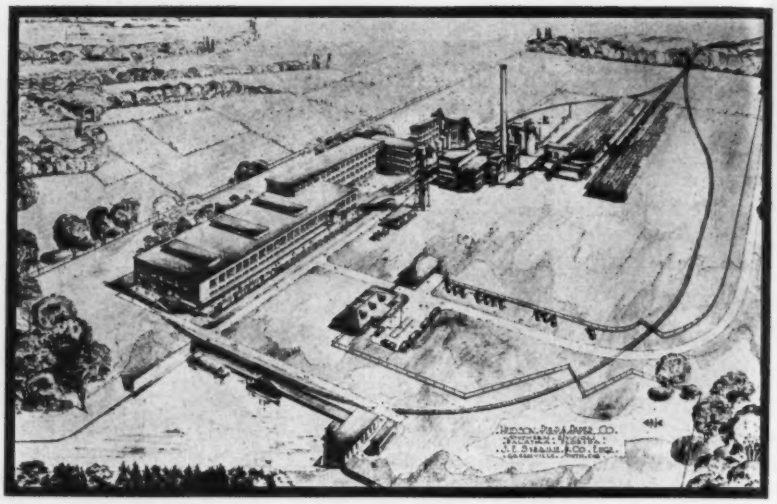
Rejects from the chip screens are returned to a re-chipper and the sawdust is removed by belt conveyor for combining with the refuse going to the bark burning boiler.

Digesters

Four welded steel digesters are provided, each having 3320 cubic feet or approximately 10-ton capacity per blow, thus providing for long cooks with a five-hour tournover. Indirect heaters have been provided for each of the four digesters, with stainless steel tubes, with the liquor being removed from the digester at a point just above the junction of the cone section and the vertical section and then re-distributed in the proper proportion through special nozzles at both top and bottom of the digesters.

Chips are delivered from the ground storage bin to the digesters with a double Redler type conveyor. Automatic relief discharge has also been included in conjunction with a relief condenser, decanter, and storage for the turpentine extracted.

The steam discharged from each digester blow will be passed through a separating cyclone and thence through a heat reclaiming system where it will be condensed and used as a medium for heating clean, incoming water for wash purposes.



Perspective drawing of Hudson Pulp & Paper Corporation's new plant at Palatka (Fla.)

Wash and Screen Room

For the de-liquoring of the pulp, three 8-ft. by 10-ft. vacuum type washers have been installed at the same elevation as the digester room operating floor, the drop legs delivering into vertical tanks at ground level. The strong liquor tank is 35-ft. in diameter; the intermediate, 27-ft. in diameter; and the weak liquor tank, 25-ft. diameter; all 20-ft. high.

Foam collected from these tanks will be delivered to a foam tank 15-ft. diameter, 45-ft. high, after passing through breakers. Black liquor soap removed at relatively low concentration from this foam tank will be taken off and combined with the feed to the steam evaporator and then removed between the effects of this unit for delivery to a skimming tank for taking off and storing; excess liquor being returned to the evaporators.

Vibrating type pre-knotters are placed ahead of the washers in order to improve economy in washing. It is tentatively planned to dispose of the knots by burning in the recovery unit or refuse boiler.

The washers are provided with hoods for the removal of vapor and a full complement of automatic control instruments, including consistency regulation and metering of the incoming stock. For ease of erection and removal of cylinders, a hand-operated crane is installed above the washers and a small elevator serves both digester and wash room floors.

The final washed stock from the last washer will be discharged by gravity into a concrete storage chest of 15-tons capacity, equipped with propeller type agitators. From this stock chest the pulp will be delivered to a mixing box for combining with white water and discharged through three centrifugal type screens, two of which will be used as primary and one as a tailings screen.

The accepted stock from the centrifugal screens will flow by gravity into an 8-ft. by 12-ft. vacuum type thickener, which will also receive some of the white water returned from the paper machine. The thickened stock will be delivered into a concrete storage chest with propeller agitation, of 20-tons capacity at 4% consistency.

White water from the thickener will be discharged through a drop leg into a concrete storage tank placed under the washed stock chest, from which recirculating pumps will provide the necessary white water for dilution and showers on the screens and thickener.

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Specialists in the design and manufacture of:

- Complete machines for fabrication of saturated felts, tar saturated felts, composition asphalt shingles and roll roofings including roll brick siding and tar saturators.
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- Complete machines for fabrication of insulated brick siding board.
- 2" and 3" steam jacketed pumps for handling concentrated black liquor, asphalt and other similarly highly viscous materials.

For information write to:

ROOFING MACHINERY MFG. CO.

Factory and Office: 1130 W. Cornelia Ave.

Phone: Lakeview 3231 Chicago 13, Illinois

Refining

For the preparation of stock before going on to the paper machine seven Jordans with 300-hp. motors, at 450 rpm, are installed, five of which will be used as primary and two for finishing. The hydrated stock from the primary Jordans will discharge into either of two concrete storage chests with propeller agitation, of 15-tons capacity each, arranged so that one of these chests can be used for broke as desired.

Arrangements are provided for consistency regulation ahead of the Jordans and metering ahead of the paper machine. Size is to be introduced in the suction of the pump ahead of the finishing Jordans and alum in the suction of the fan pump serving the paper machine. Delivery of size will be in liquid form with requisite storage capacity and facilities are provided for receipt of dry or liquid alum as desired.

The refining room is served by a 5-ton overhead crane and a close control of the Jordans by instrumentation is included.

Paper Machine

The 234-inch, high speed, fourdrinier kraft paper machine is of the most modern type, arranged for speeds up to 1400 fpm, suitable for the production of from 25-lb. to 110-lb. basis weights.

To deliver the stock of uniform consistency and velocity to the wire, a flow spreader is provided with 120-in. high slice.

The fourdrinier part is suitable for a wire 100-ft long, 234-in. wide, arranged for installing from the tending aisle without necessity of removing the fourdrinier proper. The breast roll is 28-in. in diameter; and table rolls 10½ in. There are eight 7-in. suction boxes and a 40-in. suction couch roll. Shake is of the duplex type of two units, suitable for a range of from 85 to 500 strokes per minute.

For the press part there are two sections, each with a rubber-covered upper roll 30-in. diameter and a rubber-covered lower roll of the suction type, 36-in. in diameter, all connected with a pneumatic type loading system to properly distribute the weight on the bottom rolls as desired; all mounted in heavy duty roller bearings.

Located between the second main press and the first lower dryer is a smoothing press with upper and lower rolls 30-in. in diameter; also with automatic loading device, roller bearings, and oscillating doctor.

The dryer part is arranged in two sections, with an upper and lower felt on each. The first section has twenty-two 60-in. paper dryers and four 60-in. felt dryers; the second section, twenty-two 60-in. paper dryers and two 60-in. felt dryers. All journals are of extra heavy duty self-aligning rollers.

The driving train is of the fully-enclosed type with all dryers and the lower tier of each section horizontally connected together by intermediate idler gears which, in turn, drive the upper dryers by means of idler pinions, all arranged for lubrication from a central system.

Following the dryers are two 8-roll calender stacks, four rolls of which, of the second stack, are bored and fitted for

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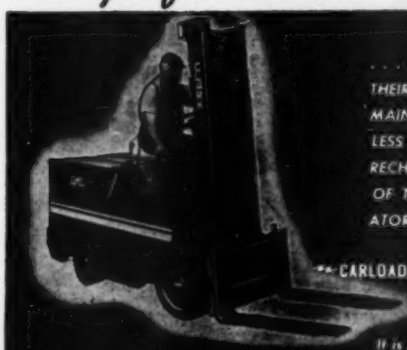
CLIPPER—CAPACITY 2,000 lbs.

Users prefer CLARK *Electric Fork Trucks!*



. . . BECAUSE THEIR INITIAL COST IS LOW—THEIR OPERATING COST IS LOW—THEIR MAINTENANCE COST IS LOW—THEY CONSUME LESS POWER AND DO MORE WORK BEFORE RECHARGING IS NECESSARY . . . AND BECAUSE OF THEIR EASE OF OPERATION, MOST OPERATORS PREFER THEM.

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steam or water connections. The bottom bearings are self-aligning water-cooled babbit, with the others of improved roller bearings, all lubricated by pressure feed oiling. Levers and weights apply pressure to the journals at the top of the rolls.

The reel is of the uniform speed type with main driving drum 42-in. diameter with four reeling drums 12⅜ in. diameter.

For the final rolls a 2-drum, uniform speed winder suitable for taking rolls up to 60 in. in diameter is provided and equipped with ten slitter units; also a mechanical ejecting and unloading device.

The winder drive is of the variable speed type through a 125-kw. MG set and adjustable speed d-c motor, arranged for a paper winding speed of 3000 fpm.

The sections of the machine requiring variable speeds will be driven by sectionalized individual motor drive having electronic control, the motors for which will obtain their current from two 700 hp. 80% PF motor generator sets, with a separate generator for each section of the machine.

Air conditioning and removal of vapor from the machine room will be accomplished by a transite hood over the dryer section, with five exhaust fans and the necessary heater and supply fans for air make-up. For providing the necessary vacuum on the flat boxes, suction couch and presses, seven vacuum pumps are to be installed, aggregating 715 hp.

The fan pump of the machine will have a capacity of 14,000 gpm and white water recovered from the paper machine and not recirculated will be returned to the system ahead of the pulp thickener.

Broke from the paper machine and returned waste from the converting plant will be conveyed to a breaker beater of 2000 lb. capacity.

A full complement of auxiliaries of the latest type has been included for the machine, such as for the conditioning of felts, removal of condensate, oiling, and instrumental control.

The machine room building itself is 342 ft. long by 69 ft. wide and while it is built to house a single machine initially, it is designed so that it can be readily expanded to house a second unit.

For servicing the machine, there is a main electrically operated crane running the full length of the building, equipped with two 15-ton trolleys for the handling of the largest rolls. There is also a 10-ton electrically operated crane for the handling of rolls from the reel to the winder and a 5-ton hand operated crane for the back drive.

Finishing and Converting

A two-story building, 324 ft. long and 152 ft. wide extends from the machine room, the first section of which, approximately 108 ft. by 152 ft., will be used for wrapping or rewinding of finished rolls or sheeting of same, as well as storage.

The section of this second floor ahead of the finishing room, approximately 216 ft. by 152 ft., will be used as a converting plant, with space for winders, bag and sack machines, as well as a central glue-making and paste department. The basement of the building will be used for gumming machines, roll storage, shipment, and will also provide space for other converting operations.

Two 8-ton, 8 ft. by 12 ft., platform type elevators serve this building from the machine room level to the basement or shipping level; one in the finishing room to take care of rolls going out for direct shipment and the other at the end of the converting building to take care of the finished, converted product.

All rolls and finished products will be handled by tiering lift trucks throughout the finishing, converting, and shipping operations; and platform type scales will be located at various points so as to record the weight of rolls coming off of the paper machine, the converting operation, and the final shipping weight.

Shipping facilities for the finished product are provided by a railroad track paralleling alongside the finishing and converting building, with another track on the water side and along the dock. Ramps will also be used for the handling of materials from the shipping floor to the dock front.

The dock is of steel sheet pile construction, having a frontage of some 300 ft., with a dredged channel and turning basin for a minimum draft of 12 ft. A channel from this dock has been dredged into Rice Creek for a distance of 1500 ft., with a minimum width of 60 ft., Rice

Magnews

Newsworthy Items for Those Concerned with Industrial Cleaning and Related Problems

September, 1947

The Best Slime *Control* Cannot Eliminate The Need for Effective Slime *Removal!*

In fact, without good slime removal, slime control isn't likely to be very workable. That's why Magnus Slime Remover is such an important part of your slime control program. It not only penetrates slime deposits fast and deeply, but it reaches into areas where hand cleaning cannot reach. Moreover, it takes up a lot of the slack caused by careless "housekeeping," removing slime from dead areas which are so often missed in "clean-ups."

Fill a beater half full of water. Add two pailsful of Magnus Slime Remover. Heat to 180°F. Then circulate this solution from the stock chest to the distributing box for ten minutes, after which it should go on the machine to the end of the wire. Hosing down, after the Slime Remover Solution has been used, will remove the softened and loosened slime that has not been carried off by the solution itself.

Keep your slime control method at top notch effectiveness by periodical clean-ups with Magnus Slime Remover.

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is readily cleaned with Magnus Pitchex. Simply work this cleaner (on a brush or broom) into all pitch spots on the wire as it passes the machine head. By the time the wire reaches the showers, deposits are softened and dispersed, ready for flushing away.

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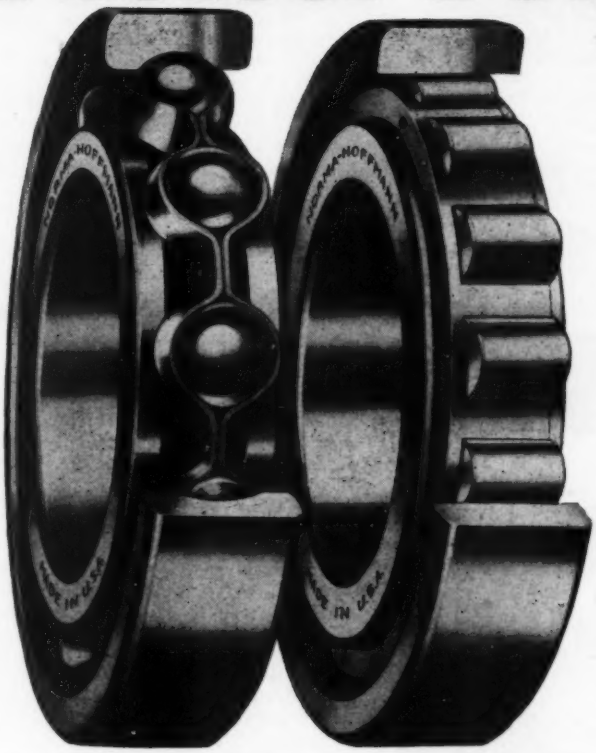

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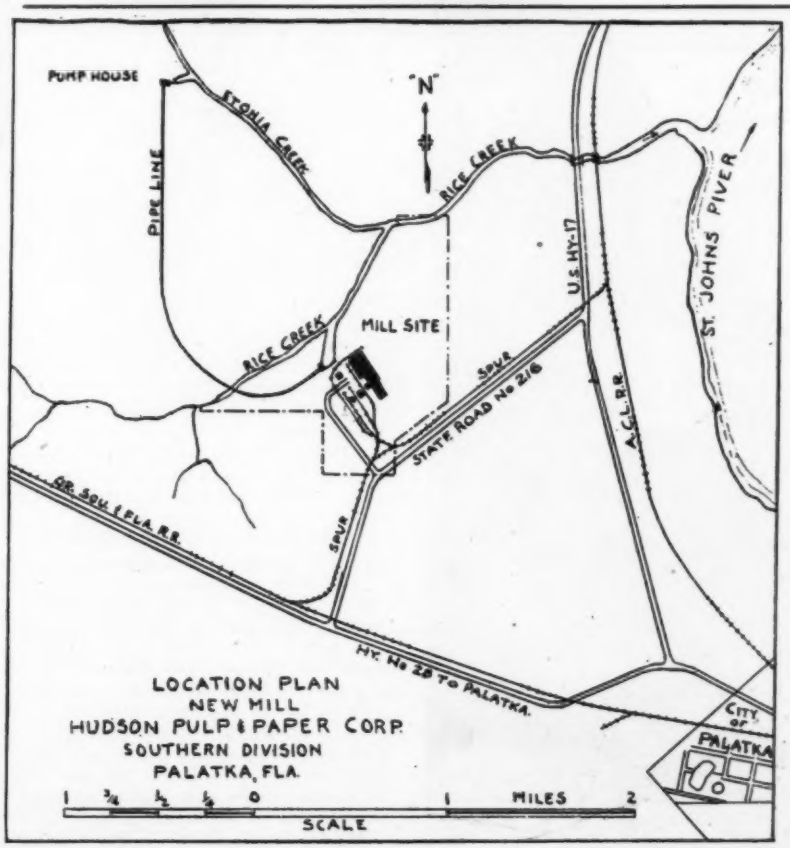


Creek having an existing channel loading into Etonia Creek and thence into the St. Johns River over a distance of approximately two miles.

The dock will also provide facilities for the receipt of incoming material. A service water pump house for the condensers and washup requirements is located at the end away from the finishing building.

Machine Shop and Stores

A two-story building 95 ft. by 90 ft., is located adjoining the dry end of the machine room and the finishing room. The upper floor of this building will be used as a machine shop and the basement for stores.

An overhead trolley with two 15-ton hoists runs along one end of this building, extending into the machine room at one end and over the railroad track at the other, providing means for handling incoming rolls and other materials; and also for the placing of rolls on a grinder located at basement level. Supplementing this hoist, a 10-ton hand operated crane will handle materials from the basement, the trolley hoists, and serve the various machine shop tools.

Recovery of Chemicals

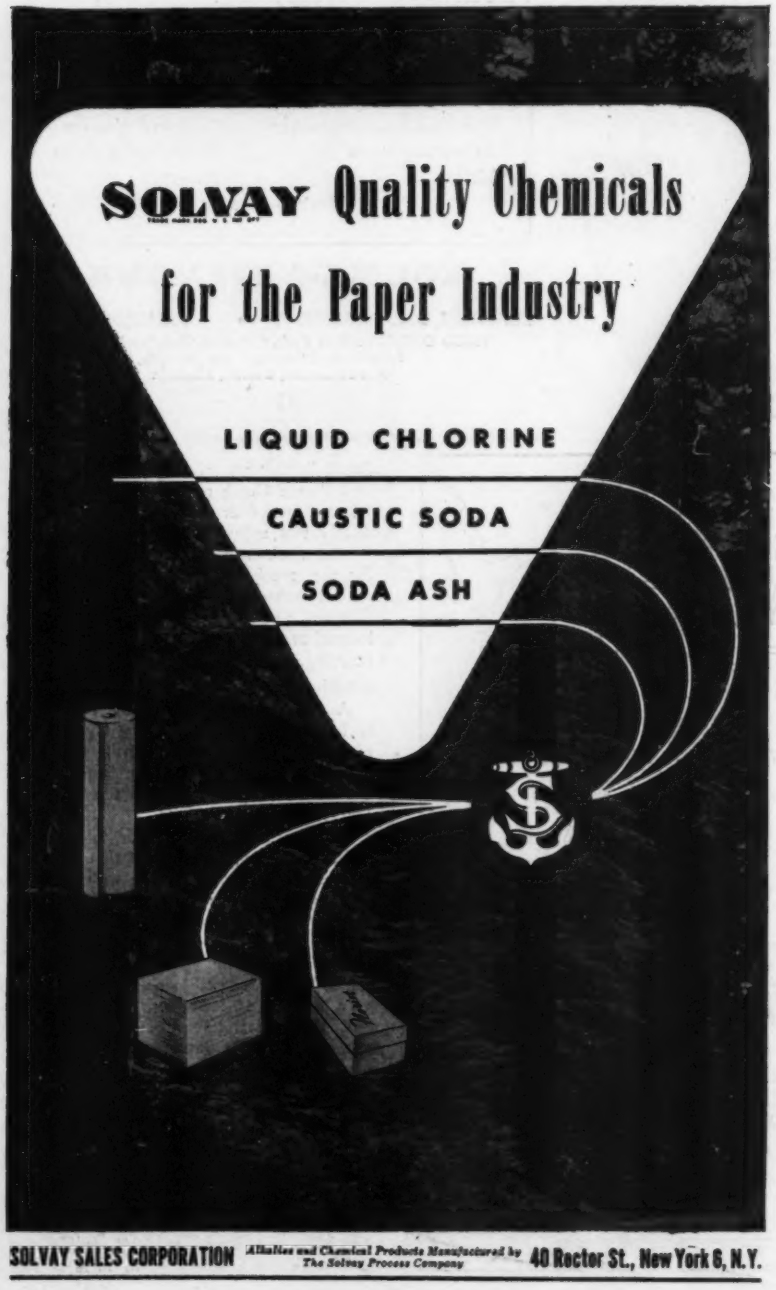
Black liquor recovered from the washing operation is to be stored in three tanks, two 20 ft. diameter and 20 ft. high, and one 26 ft. diameter and 30 ft. high, to pump continuously to a quintuplet, long tube, black liquor evaporator receiving the liquor at 16% solids and discharging it at from 50 to 55% to two

concentrated liquor storage tanks, one 14 ft. by 24 ft., and one 20 ft. diameter by 24 ft. high, from which it will be pumped through a Cascade type evaporator and finally delivered to the spray nozzles for burning in a modern type black liquor recovery and steam generator unit, having a capacity for 480,000 pounds of solids per day and generating steam at 420 psi, 725 degrees, to tie in with that generated by the main boiler plant.

The waste gas from the recovery boiler, after passing through the Cascade evaporator, will go through an electrical precipitator before entering the stack for the recovery of soda that would normally be carried off in these gases. The dry recovered salt cake from the precipitator will be conveyed to a tank where it will be mixed with weak black liquor; and when built up to sufficient concentration, returned into the disc evaporator.

Make-up salt cake requirements will be handled by a pneumatic system from railroad cars into a storage room and to the salt cake mixing tank, where it will be combined with the black liquor fed into the recovery unit.

The multieffect evaporator is placed in the open immediately adjoining the recovery building so that an automatic control, combined with that of the recovery unit itself, can be handled from one centralized point.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The chemicals reduced by the recovery unit are delivered in the form of molten smelt into a dissolving tank where they are mixed with the recovered weak liquor from the subsequent recausticizing operation required to form green liquor.

The green liquor from the dissolving tank will be pumped into a storage tank, 20 ft. by 20 ft. Before using the green liquor in the causticizing operation, it will be clarified and the resulting dregs from same further washed for the recovery of soda in a tray type thickener, the two operations being combined in a tank, 30 ft. diameter by 36 ft. high.

The clarified green liquor will be combined with reburnt lime and new lime in a slaker with a classifier for the removal of grits and the resulting milk of lime pumped to three elevated causticizing tanks, 10 ft. diameter by 8 ft. high, arranged in series and discharging by gravity into a tray type white liquor clarifier and mud washer combined as a unit in one tank, 32 ft. diameter by 36 ft. high, with clarified white liquor from this unit delivered to two white liquor storage tanks, 20 ft. diameter by 20 ft. high, where it will be available for re-use in the digesters.

The final resulting sludge from the lime mud washer will be delivered into a storage tank and final single tray thickener, 20 ft. diameter by 10 ft. high, from which it will be pumped directly to a 7 ft. diameter by 200 ft. long kiln, fired with oil, thus giving reburnt lime for the major portion of that required in the slaking operation.

The small amount of make-up lime that will be required to replace that in the relatively closed system will be handled from railroad cars into a storage tank by a pneumatic handling system for delivery into the slaker in conjunction with the reburnt lime in automatically measured quantities continuously.

The weak liquors resulting from the various washings in the recausticizing system are collected and stored in a tank, 20 ft. by 20 ft., for recirculation into the dissolving and other liquor tanks in conjunction with the black liquor recovery unit.

The controls for the continuous causticizing operation are located in an enclosed room near the slaker at about the center of the operation, the balance of the equipment being in the open.

Power Plant

The power plant is divided into three units: boiler room, turbine room, and recovery room, with the first two in adjacent buildings and the recovery room connected by a passageway and building in which auxiliary equipment is located.

The boiler room has installed in it two oil fired integral furnace power boilers, each having a capacity for generating 70,000 pounds of steam per hour. The third boiler is a duplicate of the two oil burning units but with the addition of a Hofft furnace for the burning of bark and sawdust, but arranged for burning oil as well. The boilers will operate with steam at the superheater outlet of 450 psi and 750 Fahr. total temperature, and a feed water temperature of 270 Fahr.

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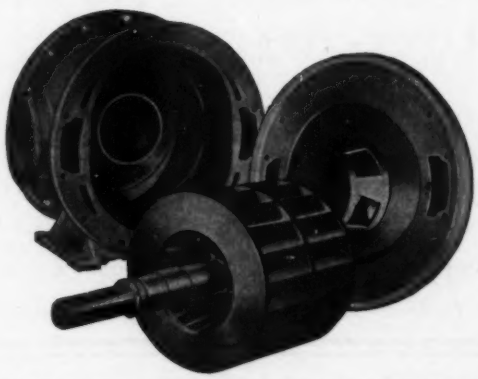

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with the recovery unit, discharge their gases into a radial brick stack 240 ft. high and 12 ft. in diameter at the top.

In the turbine room there is one 7500-kw. turbo generator of the double extraction, condensing type, with steam automatically extracted at 150 psi and 50 psi. The condenser is of the surface type, two-pass, with divided water boxes and has a total surface of 5,000 sq. ft.

In one end of the turbine room is the air compressor for mill supply, a small separate unit also being provided in the machine room for direct use on the paper machine.

A 10-ton crane in this building serves the turbine, the compressor, and the auxiliary equipment.

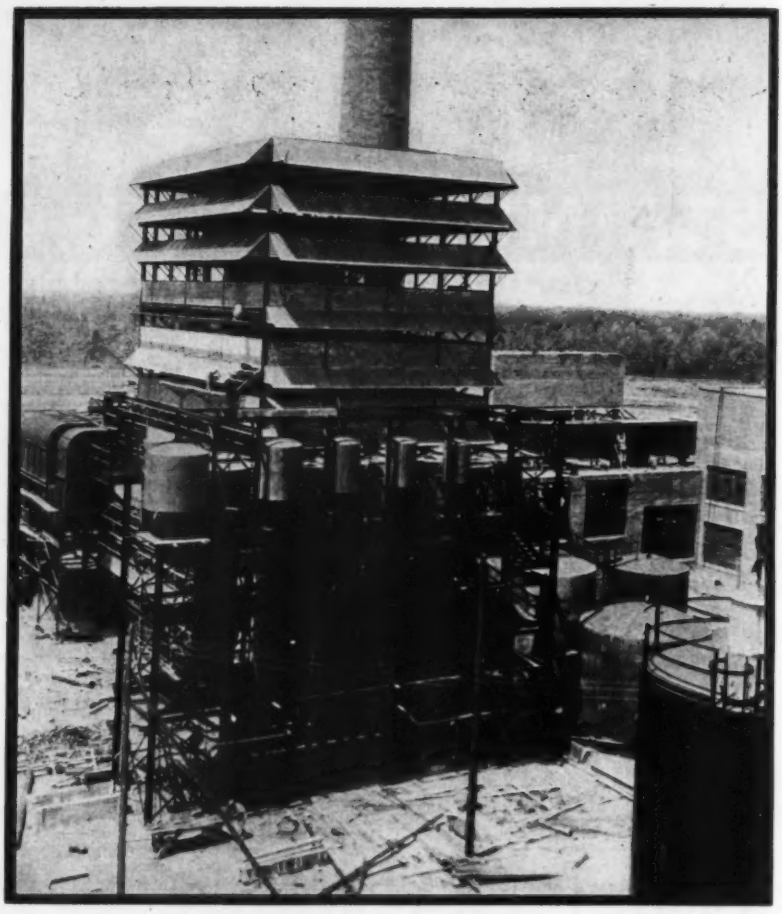
In the connecting building between the turbine room and the recovery room is located a 500,000 pound per hour horizontal type, deaerating heater and two centrifugal boiler feed pumps, one motor driven and one steam driven, with the exhaust steam from the latter delivering into the deaerating feed water heater. Also located in this building is the feed water chemical treating equipment. The initial plant operation contemplates internal boiler water treatment only.

Electrical Distribution

For the 11,500-hp. installed motor capacity, the electrical distribution is in two voltage level classes. The first or primary system is 4160 volts, 3 phase, 60 cycle, supplied by a 7500-kw. turbine driven generator. It serves direct motors rated 200 hp. and larger, as well as a number of unit type of substations. The secondary system is 440 volt, 3 phase, 60 cycle, supplied by the unit type substations. It serves motors rated 150 hp. and smaller, as well as form the primary distribution system for building lighting.

The primary distribution is the radical type, with its control, together with the generator controls, placed in totally enclosed, metal clad switchgear located in the turbine room and arranged for the outgoing circuits to correspond to the manufacturing departments. Outgoing circuits radiate from the switchgear to strategically placed control rooms wherein are located the unit type of substations and motor starting equipment.

The transformer and secondary distribution controls are combined into load center unit substations wherein the transformer and control equipment are close coupled and all interconnections wholly enclosed.



Evaporators and recovery unit

In general, full voltage magnetic starters are used throughout. Those for the 4160 volt motors have oil immersed contacts and are fitted with high interrupting capacity current limiting fuses, all mounted in self-supporting steel enclosures. The 440-volt motor starters are of the air circuit breaker magnetic combination type, several of which are grouped together in steel cabinets as a motor control center. Both the high voltage and low voltage starters are placed either in the same rooms with the load center unit substations or in adjacent rooms. Thus all of this equipment is kept out of the manufacturing areas, easily accessible for maintenance and is under control of only authorized persons and fully protected from excessive moisture conditions. Remote control push button

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stations in watertight cast iron cases are placed at each machine for the operators to start and stop the motors.

In effect, the low voltage distribution system consists principally of the circuits from the motor starter to the individual motors, which in addition to others, has the advantage of reducing to a single motor, partial shutdowns caused by trouble that might develop in any one circuit.

Fluorescent lighting is installed in those areas where conditions permit; otherwise incandescent lighting is used. The lighting distribution is 440 volts primary, stepped down to 110/220 volts with small transformers conveniently placed in the manufacturing buildings, and arranged for subdivided control limited to relatively small areas. In addition to the general lighting system, there is a "pilot light" system, or "Night Watchman Light" system, controlled from the turbine room which will be for use not only during the nonoperating hours of the plant but for emergency lighting in case something should happen to take the turbo generators off the system.

Provision has been made for connection to an outside source of power, to provide current for maintenance purposes and necessary pumps during the nonoperating hours when the turbines would be shut down, and boiler plant under repair.

Wiring, in general, is in rigid metallic conduit, installed exposed on the ceilings, walls or under trusses, and in wet areas is safe guarded, so far as is practicable, against corrosion. In these areas moisture resistant insulated wires are used as a further precaution against trouble developing inside the conduits. To reduce as much as possible work stoppages due to primary circuit failures, each circuit is designed for two complete circuits in parallel, normally to operate continuously in parallel but each of sufficient capacity to carry the load without injurious heating.

Water Supply

Water for the process requirements of the mill is obtained from a pump house on Etonia Creek having two 3000 gpm motor driven centrifugal pumps installed and delivering over a pipe line 20-in. in diameter for a length of two and one-half miles into a chamber combined with a raw water pump house located at the dock near the mill. The Etonia Creek pump house is above the point of salinity which on a few rare occasions, due to high tides and east winds, might affect the pump house at the dock. The process water received from Etonia Creek is relatively soft but has a small amount of coloring matter. Provision has also been made for a future filter plant to remove this color when a bleach plant is installed.

The raw water pump house at the dock provides cooling water for the condensers with three 3000 gpm centrifugal pumps and fire protection from two 1000 gpm fire pumps, one motor driven and one gasoline engine driven. Located in the pump house at the dock also are two 3000 gpm process service water pumps to repump the water delivered from Etonia Creek from the separate compartment to the mill at required pressure. Provision also has been made for allowing these pumps to take water direct from Rice Creek at the dock at such time as salinity is not present.

Waste disposal from the mill is carried off through a ditch to Rice Creek at some distance below the mill.

A 100,000-gallon elevated water tank is provided for an underground loop system of mains in conjunction with the fire pumps, and drinking water is obtained from a separate well with chemical treating and chlorinating equipment.

General Facilities

The main office building will be approximately 100 ft. by 40 ft. and is to be fully air-conditioned and treated architecturally in Spanish style. It is to be located in conjunction with the separate clock house, first aid, and the personnel building, 74 ft. by 25 ft., at the main entrance gates so that access to the front of the office can be obtained without going outside the fence, although access will be available to the employees to the inside from the rear of the offices. Liberal parking space for employees' cars, buses, etc., is provided in the immediate area close to the office.

A separate entrance has been provided for the delivery of incoming wood by trucks.

Liberal locker, wash and rest rooms are provided at strategic points in the mill.

A fully equipped laboratory, also air-conditioned, will be located at the center of the operations.

Facilities for automatic call, fire alarm, and telephone systems are installed and liberal paved roads dispersed throughout the mill area.

General

The Hudson Pulp & Paper Corporation, with general offices in New York City, already operates mills at Augusta, Maine; Bellows Falls, Vermont; and Lansdowne, Pennsylvania, which the new mill of the Southern Division at Palatka will supplement.

The officers of the corporation are: President, Abraham Mazer; Executive Vice President, Jacob Mazer; Vice President, William Mazer; Vice President in Charge of Manufacturing, A. M. Lund; Secretary, Samuel A. Lopin; Treasurer, Joseph M. Mazer.

The staff at the Palatka mill will consist of the following: Resident Manager, Samuel Siegel; Plant Superintendent, J. L. Richardson; Wood Procurement Manager, H. M. Shirley; Paper Mill Superintendent, W. L. Jones; Pulp Mill Superintendent, E. A. Harper; Power Supervisor, C. W. Wright; Chief Electrician, R. N. Poe; Master Mechanic, J. J. D'Arcey.

Merritt-Chapman & Scott Corporation, of New York City, were general contractors for the new mill, with M. C. McGough, vice president in charge of construction, and L. V. Forbeck representing the company on the ground as project manager.

J. E. Sirrine Company, engineers of Greenville, South Carolina, and its various departments have been responsible from the inception of the project for the preparation of all reports and final detailing of plans, under the direction of D. G. Moon, assisted by H. W. Meakin; with the supervision of the actual construction in charge of J. H. Bringhurst, Jr., as resident engineer, all working in close conjunction with William Mazer and A. M. Lund, of the Hudson Pulp & Paper Corporation.

EQUIPMENT AND MATERIAL VENDORS

Log and Chip Conveyors—Stephens-Adamson Mfg. Co.

Refuse Conveyors—Link-Belt Co.

Drum Barker, Digester Blow Down System, Turpentine Condenser, Digester Circulating System—Fibre-Making Processes, Inc.

Chipper—Carthage Machine Co.

Re-Chipper—Waterville Iron Works.

Chip Screen—Carthage Machine Co.

Knife Grinder—Samuel C. Rogers & Co.

Chip Silos—Kalamazoo Tank & Silo Co.

Digesters—Chicago Bridge & Iron Co.

Blow Valves—Fibre-Making Processes, Inc.

Blow and Storage Tanks — Hammond Iron Works, Condenser Service & Eng. Co., Inc., Taylor Iron Works.

Black Liquor Washers, Thickener, Foam Breakers, Centrifugal Screens, Blow Tank Agitator, Consistency Regulator—Improved Paper Machinery Corp.

Elevators—General Elevator Co.

Tailings Screen & Size Meter—Trimbey Machine Works.

Pre-Knotters—Bird Machine Co.

Agitators, Stock Chest—Noble & Wood Machine Co.

Jordans, Broke Beater—Noble & Wood Machine Co.

Consistency Regulators—Trimbey Machine Works.

Paper Machine — Pusey and Jones Corp.

Paper Machine Drive—General Electric Co.

Hoods and Air System—J. O. Ross Engineering Corp.

Vacuum Pumps—Nash Engineering Co.

Condensate Return System—Midwest-Fulton Machine Co.

Fan Pumps — Worthington Pump & Machinery Corp.

Stock, Liquor, and Water Pumps—Allis-Chalmers Manufacturing Co., Ingerson-Rand Co., Worthington Pump & Machinery Corp., Morris Machine Works, The LaBour Company, Inc., Goulds Pumps, Inc.

Felt Conditioning—Bird Machine Co.

Scales—Fairbanks, Morse & Co.

Winder—Cameron Machine Co.

Roll Grinder—The Lobdell Co.

Cranes — Whiting Corp., Manning, Maxwell & Moore, Inc.

Evaporators—Swenson Evaporator Co.

Recovery Boilers, Refuse Boilers, and Oil Burning, Boilers — Babcock & Wilcox Co.

Bark Stoker & Bins—The Hofft Company, Inc.

Refractories—United Refractory Construction Co.

Precipitators—Koppers, Inc.

Salt Cake and Lime Handling Equipment—The Brady Conveyors Corp.

Insulation—Jamar-Olmen Co.

Causticizing System—The Dorr Co.

Lime Kiln—Traylor Engineering & Mfg. Co.

Liquid Alum System—General Chemical Co.

Fans—B. F. Sturtevant & Co.

Stack — Alphons Custodis Chimney Const. Co.

Breechings — Hammond Iron Works, Babcock & Wilcox Co.

Feed Water Pumps — Warren Steam Pump Co.

Feed Water Heater—Cochrane Corp.

Mill Compressors—Ingersoll-Rand Co., Worthington Pump & Machy Corp.

Fire Pumps—Goulds Pumps, Inc.

Water Intake Screens—Link-Belt Co.

Condenser — Westinghouse Electric, Corp.

Main Switchgear and Transformers—General Electric Co.

Elevated Water Tanks — Chicago Bridge & Iron Co.

Structural Steel—Southern Steel Works Co.

Reinforcing Steel—Ceco Steel Products Corp.

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Motors—Westinghouse Electric Corp., Reliance Electric Co.

Fence—Cyclone Fence Div., American Steel & Wire Co.

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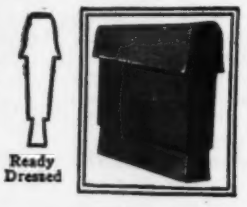
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Convention Papers . . . Abridged

Production of Fodder Yeast

ELWIN E. HARRIS, Chemist Specialist
MARTHA L. HANNAN, Bacteriologist
RALPH R. MARQUARDT, Chemist
Forest Products Laboratory[1]

Abridgments in this section are from papers presented at the annual meeting of the **Technical Association of the Pulp and Paper Industry** held in New York City, February 24-27, 1947

The production of fodder yeast from wood sugars is of interest to the paper-pulp producer for two reasons: (1) it provides a rapid means of utilizing the sugars in sulphite-waste pulping liquor and (2) it provides a means of reducing the biochemical oxygen demand of such liquors. If this yeast can be produced at a price low enough to compete with agricultural products, it may be used as a protein food for farm animals. With some promotion it is possible that the yeast may become a part of the diet for humans. This paper presents a process developed at the Forest Products Laboratory for the production of fodder yeast from wood sugars.

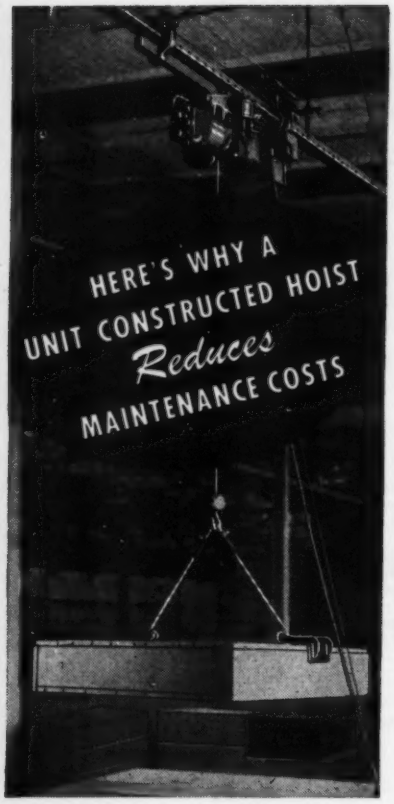
A laboratory-scale fermentor with 34 liters capacity, embodying several modifications of the German Waldhof fermentor (Saeman, J. F., Aerobic Fermentor with Good Foam-control Properties. December 9, 1946. Submitted for publication in *Ind. Eng. Chem.* anal. ed.) was constructed for use in the study of yeast production from wood sugars at the Forest Products Laboratory, Madison, Wisconsin. This fermentor is shown in Figures 1 and 2. In order to withstand corrosion and be easily cleaned, the entire assembly should be constructed of stainless steel. The sugar liquor with nutrients is fed by a proportioning pump continuously into the top next to the aeration wheel shaft and distributed by a disk on the shaft just above the liquid in order to obtain uniform distribution. Overflow spent liquor and yeast passes out through a standpipe that controls the level in the fermentor. Air is introduced through the hollow shaft of the rotating aeration wheel and delivered to the liquid from six tubes outside a central draft tube. The aeration wheel also forces the liquid out of the draft tube and up the outside so that gases may be liberated as the liquid falls down the draft-tube.

Cooling is accomplished by circulating cold water through a tube in the liquor. The temperature is controlled by a bimetallic thermoswitch, which operates two heaters on the outside of the fermentor. The *p*H is measured and conrtolled by an indicating controller, which is arranged to add a saturated solution of sodium carbonate if the *p*H is low.

Sugar Solutions Used for Yeast Production

Wood sugars from five different sources were used for the production of yeast. Wood-hydrolyzate sugars were produced by the hydrolysis of Douglas fir wood waste in the pilot plant operations at the Forest Products Laboratory (Harris, E. E., and Beglinger, E., *Ind. Eng. Chem.* 38: 890, 1946). These wood hydrolyzates contained 4.6 per cent reducing material calculated as glucose. This value included about 0.3 per cent of reducing material that was not sugar. A sample of sulphite-waste liquor was obtained from a commercial pulp plant that was pulping principally spruce. The sample was taken directly from the blowpit, neutralized with lime, and filtered to remove precipitated material. A second sample of sulphite-waste liquor from a commercial pulp mill pulping a mixture of softwoods was steam stripped to remove sulphur dioxide and other volatiles and then neutralized to *p*H 4 with lime and filtered. A third sample of commercial sulphite-waste liquor was evaporated to 40 per cent total solids and then neutralized to *p*H 4 with lime. The fifth source of wood sugar was produced in pilot plant operations, using magnesia-base sulphite pulping liquor.

(1) Forest Service, U. S. Department of Agriculture, maintained at Madison, Wis., in co-operation with the University of Wisconsin.



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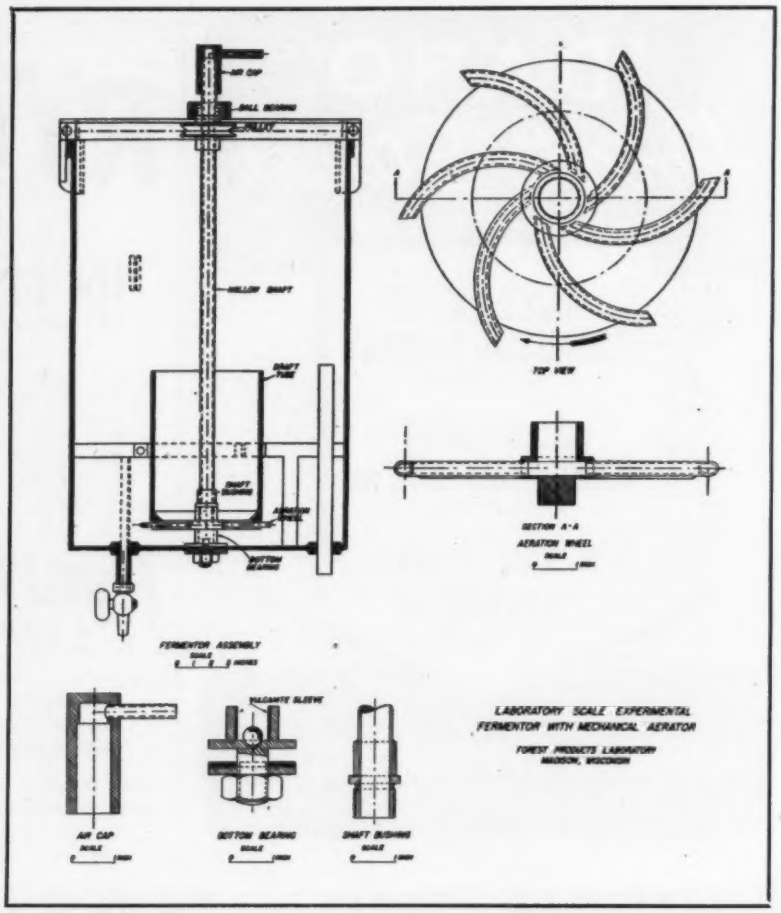

Fig. 1—Laboratory-scale experimental fermentor with mechanical aerator built at the Forest Products Laboratory with design altered somewhat from industrial-scale equipment used in Germany

METHODS OF SAMPLING AND ANALYSIS

Reducing-sugar Content

The reducing-sugar content, calculated as glucose, of the wood hydrolyzate before and after yeast propagation was determined by the Schaffer and Somogyi method (Saeman, J. F., Harris, E. E., and Kline, A. A., *Ind. Eng. Chem.* anal. ed. 17:95, 1945) (Schaffer, R. A., and Somogyi, N. J., *Biol. Chem.* 100:695, 1933).

Actual sugar content was determined by subjecting the solution to the action of yeast with aeration until the solution would no longer give a test for sugars by the osazone test. In a solution containing a 5.0 per cent reducing material calculated as glucose, 0.3 per cent reducing material was present that did not give sugar tests.

The sugar content of sulphite-waste liquor is very difficult to determine because of the large amount of nonsugar organic and inorganic material present. It was found that evaporation to half volume on a steam bath and then diluting back to the original volume removed certain substances that interfered with the sugar determination. It is evident that many nonsugar reducing substances are present because yeast that is capable of almost quantitative removal of sugars did not utilize more than 80 per cent of the reducing substances calculated as glucose.

Yeast

Yeast was determined by centrifuging a representative 10-milliliter sample of the yeast and spent liquor overflowing

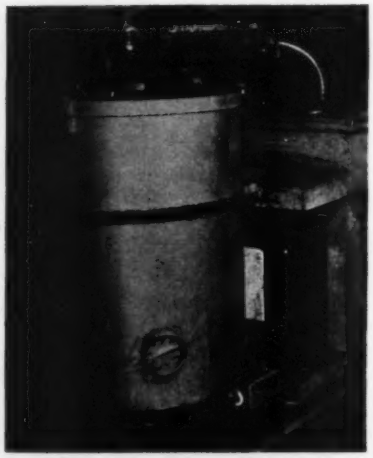

Fig. 2—Temperature-control equipment of laboratory-scale fermentor designed and built at Forest Products Laboratory

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from the fermentor, decanting off the supernatant liquor, washing twice, then centrifuging and removing the wash liquor by decantation, and finally drying to constant weight at 100 C.

Nitrogen content of the yeast was determined on the same sample used for yield by adding dilute sulphuric acid to the tube and allowing to stand until the yeast had dissolved, then washing into a Kjeldahl flask and determining nitrogen by the usual Kjeldahl method.

Air used for yeast propagation was washed by bubbling through water and then measured by an ordinary household gas meter.

Preparation of Inoculum

The yeast inoculum was prepared by transferring a small amount of yeast from a glucose malt sprout agar slant to 30 milliliters of glucose malt sprout liquid medium in an 8-inch test tube. This culture was shaken and incubated at 30 C. for 24 hours, after which the contents of the tube were placed in a 500-milliliter flask with 150 milliliters of glucose medium. This culture was then used to inoculate 2 liters of diluted wood-sugar solution for starting the yeast propagator.

The yeast used for this study was a pure strain of *Torula utilis* isolated at the University of Wisconsin and designated as *Torula utilis* No. 3 in its collection.

Starting the Yeast Propagator

The 2 liters of inoculum were placed in the laboratory propagator; aeration and continuous addition of a wood hydrolyzate solution diluted to half concentration was started. The overflow product was centrifuged and the recovered yeast returned to the propagator to hasten the growing of yeast. When yeast was to be grown on wood hydrolyzate, as soon as the product began to overflow the feed was changed to full-strength sugar and introduced at 2 liters per hour until equilibrium conditions resulted, after which the rate was increased. If sulphite waste liquor was to be used, it was fed in as soon as the amount of yeast in the propagator was about 1.5 per cent dry basis, or the amount that would be produced from the growing of yeast on the sugar in the sulphite-waste liquor. The rate of feed was adjusted to determine the maximum feed that could be introduced without loss in yield.

Discussion

The foaming property of wood-sugar solutions, when used for the production of yeast, was controlled by the use of a special type of propagator that kept the foam in a fluid condition. Continuous feed and continuous removal of product resulted in good utilization of the sugars in the solution when the throughput time was 2 to 4 hours. Satisfactory yields and operating conditions were attained with all samples except the sulphite waste liquor that had been evaporated. Since the density and viscosity of this solution was such that it could not be used satisfactorily in the equipment in full strength, it was diluted. With less than 1 to 1 dilution, it was difficult to remove the yeast. Yields of yeast were generally lower than from unevaporated liquor. The black color produced when sulphite-waste liquor was evaporated produced a dark-colored yeast that was difficult to clean by washing. Yeast grown on wood hydrolyzate or unevaporated sulphite-waste liquor was light in color and easily washed free of extraneous materials. Because of the rise in pH that accompanied the growth of yeast, the feed liquors were maintained at a low pH of 3.9 to 4.1, which aided materially in eliminating contamination and in the ease of control of the process.

Summary

Torula utilis yeast was grown on the wood sugars in wood hydrolyzates and in sulphite-waste liquor. Yields were 32 to 53 per cent of the sugar utilized.

About 94 per cent of the total reducing material calculated as glucose in wood hydrolyzates and up to 79 per cent in sulphite-waste liquor could be utilized by yeast.

A light-colored yeast was obtained from both wood hydrolyzates and unevaporated sulphite-waste liquor.

Modern Sulphite Acid Making

THOMAS GERACE, Sulphite Supt.
St. Regis Paper Company

Like many sulphite mills in the United States and Canada, the St. Regis Paper Co. modernized its sulphite mill at Deferiet, New York, with the Chemipulp hot acid system, circulating system, and

automatic controls. All these improvements are very desirable and necessary, yet without an efficient acid system full operational benefits cannot be obtained. At Deferiet there was an obsolete batch acid system which might have been satisfactory thirty or forty years ago. In the summer months when the water temperature would rise to as high as 35 C., it was a problem to make any kind of acid.

The need for a complete new acid system therefore, was very necessary. After much deliberation and after inspecting modern acid equipment, it was decided to continue the use of the milk-of-lime system. After due consideration the decision was made to install a Chemipulp-Kimberly Clark acid-making system.

Sulphur Burning

A 42-inch I.D. by 10 feet 4 inch trunnion to trunnion rotary sulphur burner (Glens Falls type) is installed. Molten sulphur from a 21-ton pit is pumped through a pipe entering at the axis of the burner. A 2 gpm Hasco sulphur pump is used while a similar pump is used as a stand-by. The pumps are built in pairs and are called the Masco duplex Sulphur Pumps. One pump has the above mentioned capacity, a second pump being a stand-by pump which can immediately be put into service by throwing in a clutch and adjusting for the desired stroke. Each pump is mounted on a separate base plate and can be readily taken from the pit for cleaning while the other pump is running.

Between the burner and combustion chamber there is approximately 30 feet of 20 inch unlined C.I. pipe. The combustion chamber, having a 9 inch lining and three baffles, was made from an old pressure filter tank. This 8 by 20 foot combustion chamber lies in a horizontal position.

The secondary air which is delivered to the back of the burner is taken from the room housing the combustion chamber and is regulated by a Leeds and Northrup automatic controller and valve. The (effluent) gas from the combustion chamber is then cooled.

Cooling System

The system used for cooling is a direct water spray type developed by the Kimberly-Clark Corporation and Chemipulp Process, Inc.

To accomplish the cooling two towers in series are used. The first tower is relatively small—14 feet long by 30 inches I.D.

The hot gas from the combustion chamber enters at the top of the primary cooler and as it travels down through the tower is sprayed with concurrent cooling water (60 gpm) by a Spraco nozzle made by Spray Engineering Company. Since sulphur dioxide is not appreciably soluble in hot water only a small amount of sulphur — approximately 4 pounds/ton — is lost by this cooling method. Whatever SO_3 is formed is absorbed by the water and the gas also is washed quite free of any sublimed sulphur. The SO_3 content of the cooking acid has never exceeded 0.03%.

From the primary tower, the partially cooled gas passes on to a second or secondary cooling tower.

Tower Operation

Because stainless steel was not available at the time of construction a 5 foot I.D. by 24 foot long wooden tower was made of yellow pine. This tower is packed with 4 inch O.D. by 4 inch packing rings and has a rather large quantity of cooling water — approximately 100 gpm — introduced into the tower through a spray nozzle at its top. The gas flows countercurrent to the cooling water. To keep sulphur loss at a minimum, the water from this tower is pumped through a heat exchanger to reduce its temperature and back to the top of the tower.

To maintain the water level in the secondary tower, makeup water is added in the weir box. The SO_3 absorbed by the cooling water and which collects at the bottom of the tower overflows to the sewer. The presence of sublimed sulphur can be detected immediately by the milky appearance of the water in the weir box in the overflow from the primary tower.

In case of either power failure or stoppage of the circulating pump for any reason, an automatic valve will open a fresh water supply for the spray in the primary tower to prevent damage to the equipment from overheating.

The cooled gas, which has been kept at approximately 19 per cent since the acid plant was started, is then delivered through a hard lead line by a 12 by 12 inch heavy duty Roots-Connersville blower constructed of chrome nickel iron material. The blower will deliver 1200 gpm at 7.5 psi pressure.

The two absorption towers, which are also made of yellow pine, are 5 feet I.D. by 24 feet. Each tower has four active bubble compartments, obtained through the use of bubble caps. The bubble caps were made at the mill from lead and are quite satisfactory. The two towers are in series so that they may be used as strong acid and weak acid towers, reversing the towers in function at regular intervals. By so doing, any lime and monosulphite makeup in either tower, during the period of functioning as the weak tower, is removed by passing it into solution during its period of operation as the strong tower. This eliminates the decidedly disagreeable and rather expensive practice of periodic manual cleaning.

A heavy lime slurry of approximately 250 grams per liter or 26° Bé. at 95 Fahr. is made up and pumped to a mixing tank in the acid plant. Lime slurry of the proper density is supplied from the proportioning unit to the absorption towers. The proportioning unit consists of two Proportioneers operated by steam. The Proportioneers have an adjustable stroke and when once adjusted to give the desired results react automatically with an increase or decrease in the amount of acid made. This system works satisfactorily. Combined SO_3 seldom varies more than 5 per cent. This is believed to be very good since the dolomite lime comes from six or seven different suppliers.

Recovery System

A very important part of the new acid system is the independent recovery system.

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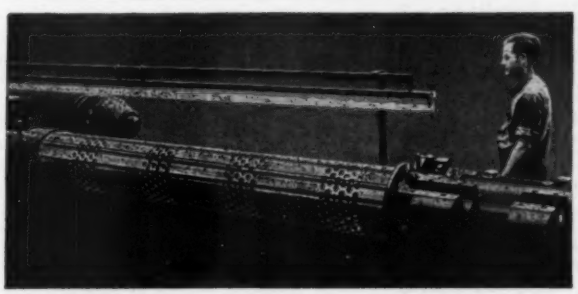

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Obviously, by this procedure no reclaimed gas enters the raw acid system. Therefore, the air flow into the burner system remains constant for any set rate of operation, and, therefore, the burning system requires little attention.

The system was designed for 125 tons daily pulp production. However, only approximately 75 tons are made at present and so it is difficult at times to keep the acid concentration from going too high.

Table 1 illustrates the build-up of acid from the raw acid to accumulator acid.

Table 1

	Total	Free	Combined
June, 1946...	3.40	2.00	1.40
July, 1946...	3.50	2.15	1.35
Aug., 1946...	3.30	1.90	1.40
Sept., 1946...	3.35	2.05	1.30
Oct., 1946...	3.60	2.15	1.45
Nov., 1946...	3.65	2.20	1.45

Accumulator Acid at 40 Pounds				Pressure Temperature, ° C.
June, 1946...	7.50	6.50	1.00	80
July, 1946...	7.60	6.55	1.05	82
Aug., 1946...	7.45	6.42	1.05	83
Sept., 1946...	7.90	6.88	1.02	81
Oct., 1946...	8.10	7.10	1.00	80
Nov., 1946...	8.40	7.32	1.08	78

Experiments on the Production Of Insulating Board and Hardboard from Western Sawmill and Logging Waste[1]

S. L. SCHWARTZ, Engineer
J. C. PEW, Engineer
E. R. SCHAFER, Engineer
Forest Products Laboratory[2]

Eight samples of sawmill and logging wastes and three mixtures of equal parts by weight of some of the wastes, as given in the following list, were tested.

(1) Western hemlock slabs and edgings; (2) western hemlock hogged planer ends; (3) western hemlock hogged veneer waste; (4) Douglas fir, old growth, slabs and edgings; (5) Douglas fir, old growth, hogged planer ends; (6) Douglas fir, old growth, hogged veneer waste; (7) Douglas fir, old growth, planer shavings; (8) white fir cordwood (logging waste); (9) mixture of Douglas fir, old growth, slabs and edgings and western hemlock slabs and edgings; (10) mixture of Douglas fir, old growth, slabs and edgings and Douglas fir, second growth, cordwood (logging waste); (11) mixture of Douglas fir, old growth, slabs and edgings and white fir cordwood.

The wood wastes, either as received or later converted to chip form, were treated, or softened, by soaking in water or by some cooking procedure and then pulped in a 36-inch Bauer mill. One of the wastes, western hemlock slabs and edgings, was selected for a variety of treatments as follows:

(1) Soaking in water; (2) Steaming at elevated temperatures and pressures; (3) Digesting in water at elevated temperatures and pressures; (4) Digesting in neutral sodium-sulphite solution at elevated temperatures and pressures; (5) Digesting in caustic-soda solution at elevated temperatures and pressures; (6) Digesting with lime and water at elevated temperatures and pressures.

Five-eighths-inch chips were prepared from the western hemlock slabs and edgings. For the experiments involving water-soaked chips, a quantity of the chips were soaked in water at room temperature for 24 hours and then divided into lots of 10 pounds each (oven-dry equivalent) for milling. At first, the chemical, steam, and water-cooking treatments were conducted in a 1.5-cubic foot stainless-steel-lined rotary digester, and the charge of chips in each case was, on an oven-dry basis, approximately 12.5 pounds. In each type of treatment, several such digestions were made in order to arrive at appropriate cooking and milling conditions. Later, selected procedures were followed by cooking in a 13-cubic foot digester, using 50 pounds or more (oven-dry basis) of chips and subdividing the cooked chips into portions for milling trials.

In conducting the smaller digestions, yields were determined by sampling the softened chips after they had been soaked overnight in hot water. This procedure gave unreliable results, because, even after the long soaking period, the chips contained considerable soluble matter. Consequently, in making the larger digestions, the yields were determined by processing a sample of each run in a 10-pound size beater and determining the resulting amount of washed stock.

The other wastes were digested by a single process only; that is, steaming at an elevated temperature and pressure. A schedule of ½ hour to a maximum temperature of 180 C. and ¼ hour at that temperature was used. The cooks were made in the larger digester, and yields determined by fiberizing a sample of the chips in the beater as explained previously.

Except for the soaking process the treated chips were milled, using B-980 plates run in a counter-clockwise (cutting) direction. In the experiments with soaked wood, it was found preferable to reverse the direction of rotation in order to secure a brushing action. The resulting pulps were collected in a screen box, and a preliminary Oliver freeness was determined, on the stock in this state. The pulps were then pressed to remove excess water, the dryness determined, and the Oliver freeness checked, using accurately measured samples. The Oliver freeness of a stock suitable for running on existent commercial board machines should be between 40 and 60 seconds. It was found difficult, even with repeated trials, to mill

(1) Acknowledgment is made to the Simpson Logging Company, Shelton, Wash., for its co-operation in this work; (2) Forest Service, U. S. Department of Agriculture; maintained at Madison, Wisconsin, in co-operation with the University of Wisconsin.

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small runs within these limits. Consequently, the mixing of free and slow pulps to obtain a suitable freeness was resorted to in several instances. When this practice was used, the component pulps selected usually had been milled so as to be reasonably close to this desired freeness range.

Insulating Boards

Insulating boards of approximately ½-inch thickness and 17-pounds-per-cubic-foot density were formed in an 18-inch-square improvised suction mold. The charge of pulp was dispersed in water by means of an electric stirrer in a 30-gallon tank fitted with a 2-inch, quick-opening valve. Sufficient water was added to bring the consistency to 1 per cent. The suspension was then neutralized with a small amount of 10 per cent solution of sulphuric acid. This was done to overcome the high alkalinity of the local water supply, which sometimes interferes in the sizing operation. Four per cent rosin size and then 4 per cent papermakers alum were added. The pH of the stock at this stage was approximately 5. At this point the agitation was discontinued and the stock run into the mold. The stock was stirred in the mold; the suction was then applied, and the mat sucked as dry as possible.

The wet mat, approximately 1½ inches thick, was removed, placed between sheet-metal cauls, and pressed in a hydraulic press so that the springback thickness was approximately ⅜ inch. This control was obtained by the use of stops between the press platens. The stops varied from 5/16 inch to ½ inch, depending on the nature of the stock.

The pressed mats were then transferred to a drying frame and dried 14 to 16 hours, or longer if necessary, in a forced-circulation oven at 45 to 65 C. The finished boards were cut into test specimens.

Hardboards

The wet mats of rosin-sized pulp for the approximately ⅛-inch-thick hardboards were formed in an improvised 13-inch-square suction mold. The charge of pulp was sufficient to produce a board of a density of 60 pounds per cubic foot. The forming procedure used was similar to that used in making insulating boards.

These mats, approximately 1½ inches thick, were placed on 16-mesh galvanized-wire screen that was moistened with a lubricant, such as N-butyl stearate or Montan wax. The screen and mat were then placed in a 15-inch-square galvanized-iron tray, covered with a 14-inch-square stainless-steel caul, also coated with a lubricant, and pressed in a 14- by 14-inch, steam-heated, 125-ton-capacity press.

The pressing schedules used entailed three stages: (1) in which the excess water was pressed out and the press platens brought up to temperature; (2) in which the pressure was lowered to allow the mat to expand, thereby insuring uniform drying throughout; and (3) in which sufficient pressure was applied to bring the density of the board up to the desired 60 pounds per cubic foot.

In the first stage, a pressure of 500 to 600 pounds psi was gradually applied to the mats to squeeze out the excess water. This pressure was maintained for 2 minutes while the steam was on and the platens were heated to 185 C.

The second stage, which lasted for 1½ to 6 minutes depending on the material employed, was initiated by reducing the pressure on the pulp mat to 100 pounds psi or less. The platen temperatures during this stage rose from 185 C. at the start to 190 C., where it was held until the pressing was completed. The reduced pressure was maintained until the pressed mats were nearly dry. This point in the drying schedule could be determined in one of two ways. In most instances, the time when no escaping vapor from the pressed mats was visible, was taken as the end point. If satisfactory results were not obtained in the first boards formed, the period was shortened or lengthened as required for subsequent panels. A much more satisfactory indication of the termination of the second stage was obtained by a thermocouple in the mat. The temperatures of the pressed mats were found to reach a constant value slightly above the boiling point of water. This temperature was maintained until the mats were nearly dry. The temperatures of the mats would then rapidly rise to the temperature of the heated platens. The second stage was terminated when the temperature of the mats began to increase rapidly.

The third stage consisted of raising the pressure again to 500 or 600 pounds psi. The higher pressure was maintained until the summation of periods was 10 minutes. In some cases the third stage undoubtedly could have been shortened, thus reducing the total time to less than 10 minutes. Although in the experiments some boards were removed from the press hot and others after cooling, it was evident that cooling of the press was not required.

The results of various treating methods used on western hemlock slabwood may be summed up as follows:

1. Boards produced from the milled, uncooked wood are likely to be, at best, marginal in strength properties.

2. For simplicity of process and strength of product, steaming appears to have an advantage over the other cooking processes. Steaming appears particularly advantageous for hardboards. Due to the organic acids evolved, precautions against corrosion might be required.

3. For these products, water cooking has no special advantage over steaming and would be more costly.

4. Cooking with 5 per cent caustic soda (based on wood charged) would be satisfactory for insulating board, though a higher energy consumption in milling is indicated. The only advantage of the caustic-soda treatment over steaming is that ordinary steel digesters could be used. The results obtained by cooking with 2 per cent of caustic soda indicate this to be an insufficient amount of chemical.

5. Four and two-tenths per cent of sodium sulphite and 0.8 per cent of sodium bicarbonate (calculated as carbonate), based on wood charged, appear to be insufficient amounts of these chemicals to insure a good margin of strength with this type of digestion, but 7 to 8 per cent of total chemicals should suffice. The energy consumed in milling the stock was very high. Neutral sulphite liquors, however, have the advantages of being noncorrosive to ordinary steel and of producing relatively light-colored boards.

6. More than 2 per cent of lime and longer cooking time than with the other cooking processes are indicated for this type of cook.

The Douglas fir in all forms gave low-strength boards. The hogged planer ends gave particularly poor results.

The yields of pulp obtained from the Douglas fir wastes were several per cent lower than those from the hemlock, due, presumably, to the high content of water-soluble, extraneous matter in the fir.

The white fir cordwood produced insulating board with satisfactory strengths when used either alone or in a 50-50 mixture with Douglas fir slabs and edgings. The 50-50 mixture of Douglas fir slabs and edgings with Western hemlock slabs and edgings, though slightly weaker, was promising.

The linear expansion with humidity changes was high for all of the insulating boards and, in general, exceeded the specification limitation. The reason for this is not known, but it is thought to be due to sizing or fiber formation rather than to species or to the cooking procedure.

None of the experimental hardboards met the strength required by the government specifications; but the western hemlock slabs and edgings, the western hemlock hogged veneer, and the white fir cordwood would undoubtedly prove

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500	GE	660	250
500	GE	2300	250
300	GE	440	220
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200	GE	440	250
150	FL Wayne	440	250
150	GE	2300	250
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satisfactory with improved procedures.

It is concluded that western hemlock mill and logging wastes can be converted into acceptable insulating board and hardboard provided the waste is not too finely divided nor crushed excessively in preparing it for processing. For strength of product and simplicity of treatment, steaming appears to be a satisfactory method of softening prior to milling. By the steaming method, white fir is as suitable as western hemlock, but Douglas fir alone gives definitely inferior boards. It is possible, however, that Douglas fir, especially the chipped slabwood and cordwood, could be used as a portion of the furnish. It is also possible that more favorable results could be obtained from Douglas fir by use of other cooking and manufacturing methods.

Abridgments in this section are from papers presented at the annual meeting of The American Pulp and Paper Mill Superintendents Association, held at the Edgewater Beach Hotel, Chicago, May 22, 23, and 24, 1947

An Operational Survey of Electrical Equipment in Paper Mills

L. E. BECK
Resident Engineer
Mutual Boiler Insurance Co.

This paper will be directed primarily to those of you who are operating plants twenty or more years old. This age was chosen because it was about twenty years ago that the trend toward electrification of paper mills got well under way.

Consider the implications of the 1947 National Electrical Code as compared to the code presented in 1925 and in use in 1927.

Suppose that we have a 200 hp., 440 volt, jordan motor. This motor would have a full load rating of approximately 240 amperes. In 1927 we could have run a cable in conduit to this motor with a current rating of 110 per cent of the name plate ampere rating of the motor. This would be roughly 265 amperes, and the code at that time said that a 300 MCM was good for 275 amperes so the 300 MCM was run. Today this same motor would require a 500 MCM cable which is now rated at 320 amperes and was then rated at 400 amperes.

Further suppose that this motor is driving a boiler forced draft fan instead of a jordan. The cable is run through the boiler room where the summertime room temperature reaches 110 Fahr. which is not at all unusual for many boiler rooms. Our present code states that the cable loading shall be reduced to 71% of code rating when operated in a room at this temperature. Seventy-one % of the code rating of a 1,000 MCM cable is 323 amperes which is the rating of the 500 MCM cable. Therefore, instead of using a 500 MCM conductor, we must use a 1,000,000. In 1927 we had no correction factors to consider.

Now if we should decide to parallel two smaller cables instead of using the 1,000,000 we encounter this: In two 300 MCM we would have a little more than the capacity of one 1,000 MCM, but we find that when from four to six cables are run in one conduit, or cable way, we reduce the capacity to 80% of the code table. This means that instead of two runs of 300 MCM, we should use two runs of 500 MCM. Compare this for a moment with the 1927 installation of a single run of 300 MCM.

This does not mean that all cables installed twenty years ago will promptly fail, but it does mean that there are many now in use that are carrying more load than that for which new cable of the same size is now rated.

A survey of the electrical distribution system of most any paper mill will reveal that considerable expansion has been made since its installation and much of the new equipment has been connected to existing circuits. This has been particularly true during the war years when material shortages were so acute.

The temperature attained by a conductor depends on the room temperature, the temperature of the conductor itself and the ability of the surroundings to radiate heat. The amount of energy changed into heat in watts is equal to the resistance of the

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conductor in ohms times the square of the current in amperes. In effect, this means when the value of the current in a conductor is doubled, the energy loss and heating effect is multiplied by four. Inasmuch as the maximum temperature is an extremely important factor in the life of an insulating material, it is imperative that these things be given serious consideration when contemplating further connections to existing circuits or when new installations are made.

I am quite sure that if you could see the actual condition of some of the insulation hidden in conduits in your mill, you would spend some restless nights until replacements were made.

The accompanying illustration shows sections of a #1/0 Type R cable that had been in service nineteen years. It had served as a main lead to a 100 hp. forced draft fan motor and operated under precisely the same conditions as outlined earlier in this paper. Note the small sections of rubber insulation at the lower center of the photograph. These were broken out by merely pinching the cable with the fingers. All semblance of life has been lost and the material is practically worthless as an insulating medium. Incidentally, our present code calls for nothing less than a 250 MCM Type R or a #3/0 varnished cambric Type V for the particular service from which this cable was taken instead of the #1/0 shown.

A great many of the electrical failures that are experienced are due to fatigue of the conductor and deterioration of the insulating material. A very prominent manifestation of fatigue is the failure of disconnect and terminal studs. Failures of this kind are not always recognized as fatigue because when the fault occurs, the material at the point of failure is usually consumed by the resulting arc and all evidence of fatigue is therefore obliterated.

Due to the exposure and type of operation in a paper mill, twenty years is generally considered to be the safe useful life of a motor winding. Much, of course, would depend on the particular application. Most jordan motors would be less,

and probably a rewinder or similar motor would be more, but generally speaking twenty years is all you can safely expect.

I am familiar with one mill that has several direct current variable speed line shaft drives. These are the usual type that were installed eighteen or twenty years ago. About two years ago several of the voltage regulator and relay coils of the motor-generator control failed due to deterioration of insulation. These failures were not in themselves serious, but in each case from two to three hours production was lost while the coils were being replaced. It is considered advisable to check and tabulate the internal resistance of all such coils at regular intervals and when any decrease in resistance is noted, which would indicate shorted turns, they should be replaced.

We are currently hearing a great deal about silicon insulations, but to date we have not had sufficient experience with them to predict their life expectancy under moisture conditions.

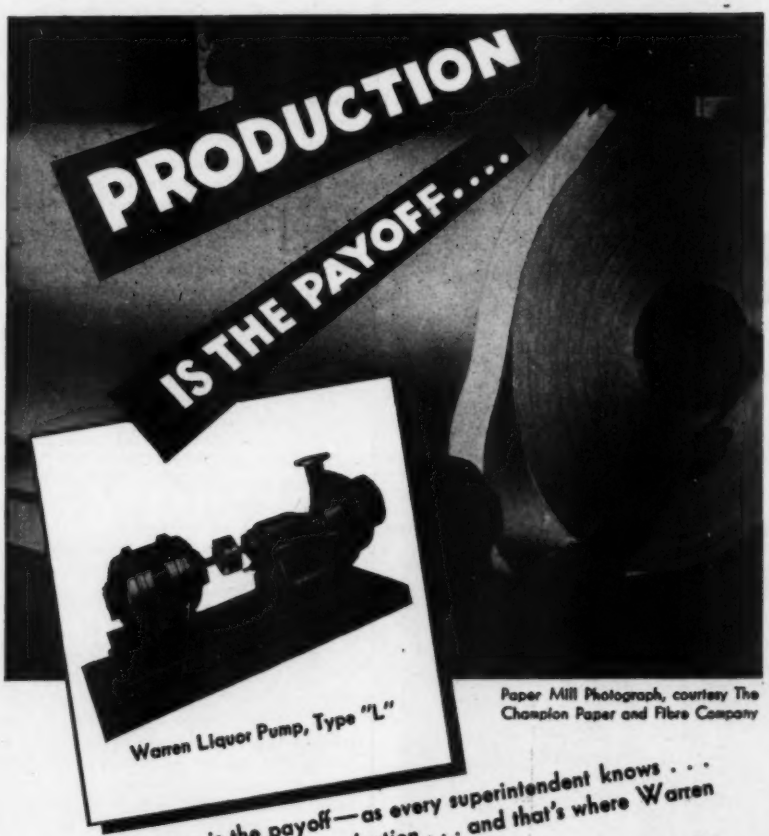
The field of the turbogenerator is another point where the effects of age show up. It is considered advisable to test the internal resistance of the field windings at each dismantle inspection. Quite frequently high resistance connections develop at the collector rings in old fields. These are relatively easy to correct, but if they are allowed to remain, they may cause overheating and eventual failure. A low resistance value would indicate shorted turns which could cause an uneven field strength and possibly a mechanical vibration within the machine.

The value of the original resistance can be obtained from the manufacturer by furnishing them with the field serial number.

It is also well to bear in mind that the heating of the turbogenerator rotor is usually the limiting feature in the operation of such machines, and it is, therefore, important for plant operators to check the field current, power factor, and phase unbalance regularly. As long as the field current and power factor are respectively below and above the value shown on the name plate, and if the phase current unbalance does not exceed 5% at full load, no excessive heating of the rotor should result.

It is extremely important, particularly with old equipment, that it receive periodic inspection and careful maintenance. If records are kept of field megger readings on old machines, deteriorated and carbonized insulation will often times be indicated by low insulation resistance readings. Any low resistance reading should be investigated thoroughly and every effort should be made to raise it to at least one megohm before the machine is again placed in service.

I am not trying to imply that the entire electrical system of your twenty-year old mill is just about to collapse, but I think it is now time to seriously consider some additions and replacements to avoid the failures that are sure to come if we try to force the old equipment too far.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Paper Mill Photograph, courtesy The Champion Paper and Fibre Company

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pp-41

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Business and Economic Research

JAMES M. CLEARY
Committee for Economic Development

Four years ago—when we were less than half-way through the war, the Committee for Economic Development publicized its conclusion that a post-war goal of from 53 to 56 million civilian jobs not only was necessary if we were to avoid mass unemployment, but also was attainable. This brought upon the CED scathing criticism for setting a fantastic objective. Critics predicted that this goal could not be reached and, therefore, would be a tremendous embarrassment to business in the postwar period. Today, the civilians employed in the United States number far more than the maximum set by the CED, and at least ten millions more than in 1940—our peak peacetime year.

Of course, many factors and agencies contributed to this result but the Committee for Economic Development was the only group which had as its sole objective the attainment and maintenance of high levels of production when war production ceased. It was the only group which concentrated all its energies on the apparently impossible goal of jobs immediately for all demobilized veterans and war workers. Through more than 70,000 business men in 3,000 communities, the CED organized practical aggressive postwar planning by hundreds of thousands of businesses large and small. Today, there are plenty of jobs. The field development division of CED has been disbanded. Its work is done. The research division, however, is continuing, and I am here today to tell you something of its program and its method of operation.

There are 96 business men on the CED board of trustees. Of this number, 15 constitute a research and policy committee. Ralph Flanders, of Jones and Lamson, served as chairman until his recent election as senator from Vermont. He has been succeeded by Raymond Rubicam. Members include Hoffman, of Studebaker; Reed, of General Electric; Harrison, of New York Life; Eric Johnson; Jay Hormel; Beardsley Ruml and others of comparable stature.

This committee of business men has appointed a research advisory board of eight of the top social scientists in the United States—Slichter, of Harvard; Calkins, of Columbia; Brown, of M. I. T.; Cavers, of Harvard; Jacoby, of Chicago; Lasswell, of Yale; Schultz, of Chicago; and Young, of the Federal Reserve System. It has also employed a research staff headed by Prof. Theodore Yntema, on leave from the School of Business of the University of Chicago.

The business men of the research and policy committee decide on the subjects to be studied but the selection of the man, or men, to make each study is left to the research director and the advisory board. An attempt is made, of course, to employ the best man in the United States in each particular field. To get the best man, he is assured complete independence in making his study. He is offered the advice of the other scientists and of the business men, but the study as finally published is completely uncensored and entirely his own.

The CED has not done any lobbying and does not intend to. Its representatives appear before congressional committees only on invitation. The CED has no cut-and-dried program of legislation—no cure-all, no panacea. Its object is to study basic economic problems and to promote a sound understanding of those problems by all voters, but particularly by business men.

Since the obective of CED is to stimulate constructive thinking and research in the public interest—not to advance the interests of any corporation or of any industry—not to pass or to defeat any legislation—not to elect or to defeat any candidate for office, it enjoys a freedom of utterance and action that is as refreshing as it is unique.

It is typical of the integrity and restraint of the Committee for Economic Development that each statement of policy carries the following warning:

"Neither this statement on national policy nor any other statement by the CED research and policy committee claims either indirectly or by inference to represent the views of the trustees or of the business men and others throughout the country who are affiliated with CED. Up to the date of publication, they have not participated in the background discussion between business men and economists leading toward the development of the statements."

But just how effective have CED statements been? That's a fair question. The low pressure methods of CED make it a bit difficult to trace cause to effect, but here is some circumstantial evidence.

Do you remember the great fear business had in 1942, 1943 and 1944, that the termination of hundreds of thousands of war contracts would lead to scores of thousands of bankruptcies and vast, interminable litigation?

Many business men were certain that the problem was so big, so complex that it was insoluble. They were sure that billions of dollars in complicated claims could not be adjusted with fairness to contractors and protection to the government.

The first attempt ever made to lay down rules for handling this problem was this little policy report issued by CED in October, 1943. All but one of its recommendations were ultimately adopted. The one recommendation not adopted was for a large expansion of legal machinery to take care of the great mass of litigation assumed to be inevitable. Such action became unnecessary because the settlement of our war contracts has been the most efficient operation by Government in the history of the world.

More than 300,000 prime contracts and millions of sub-contracts have been settled with fewer than 150 appeals. Many factors contributed to this amazing result—the Baruch-Hancock report, the work of General Clay, General Browning, General Hauseman, and the Office of Contract Settlement under Robert Hinckley—but CED made the initial contribution of sound thinking.

Do you remember that after VE-Day,

(Turn to page 896)

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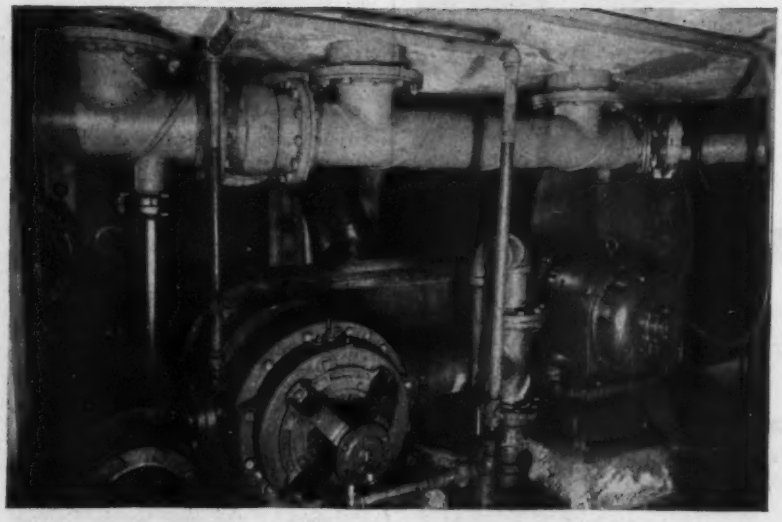

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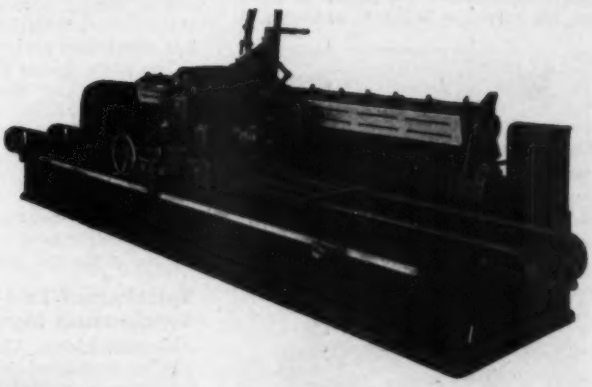

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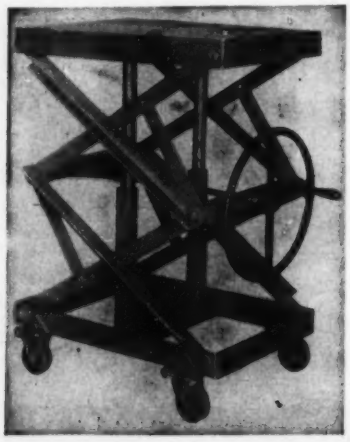
NEW EQUIPMENT AND SUPPLIES

Portable Industrial Elevating Table

Montgomery & Co., Inc., 53 Park Place, New York, 7, N. Y., has announced a portable elevating table for various industrial applications. Designed to carry and lift a load of one ton, and remaining fixed in any position, the table equipped with two ball bearing swivel and two stationary casters, has a minimum height from floor of 26 in., a maximum height of 43 in. The table top is 20 in. by 32 in. One complete turn of the handwheel elevates the table top ⅜ of an inch.



One-Man Electric Chain Saw

A one-man, high cycle electric chain saw has been announced by the Homelite Corp., Port Chester, N. Y. Weighing 27 pounds complete, this saw can be used for felling, limbing or bucking trees or for cutting timbers up to 20 inches. It may be used for cuts at any angle.

The electric power for the saw is furnished by a Homelite High-Cycle (180-cycle) generator, either Model 24A230/180 or Model 25A230/180, driven by an integral gasoline engine.

Model 24A230/180 generator which will operate one chain saw has a rated capacity of 2500 watts and weighs 120 pounds complete with engine. Model 25A230/180 will operate two chain saws; it has a rated capacity of 5000 watts, and weighs 171 pounds.

The generator requires no manual attention during operation. An integral governor automatically controls the engine speed from no load to full load.

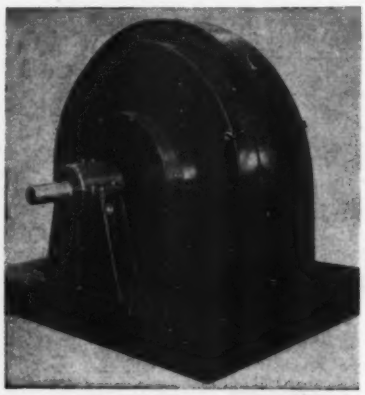
The motor driving the saw is a 2½-hp., 180-cycle 3-phase electric motor with a grounded connection. Sealed ball bearings support the motor shaft and sprocket shaft. Pressure lubrication is provided for all moving parts, including gears and saw chain.

If two-man operation of a saw is desired, a helper handle can be attached to the end of the saw opposite the motor.

Splashproof Low-Speed Synchronous Motor

General Electric Co., Schenectady, N. Y., has redesigned its line of low-speed synchronous motors to include splashproof construction.

Simple design of end-shield covers makes it easy to remove and assemble them when inspecting a motor. The pedestal bearings are outside the housing, permitting regular inspection of oil supply and oil ring operation.

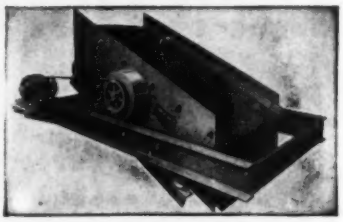


The new frame construction saves floor space as it has louvered openings for the side air discharge instead of the flared-skirt type of opening. The conduit box is included in the frame structure of the motor to protect it from splashing liquids.

An inspection window is provided in the air chute for viewing the brush holder and collector without removal of the covers.

Vibrating Screen

An inclined floor-mounted or spring-and-cable suspended screen, with a balanced two-bearing vibrator mechanism which imparts a concentric or circular motion to all points of the screening surfaces, has been announced by Link-Belt Company, 307 N. Michigan Ave., Chicago 1, Ill. Designated as the "CA" *Concentric-Action Screen*, this model is made with double or triple decks and in sizes ranging from 3 ft. by 8 ft. to 6 ft. by 14 ft. Single-deck screens can be provided by merely removing the lower deck of the standard-double deck screen.



Typical of the materials which can be sized effectively by the screen, according to the manufacturer, are the following: clay, bituminous coal, dolomite, ground lime, pebble lime, limestone, soda ash, sulphur, talc and wood chips. Likewise, the manufacturer cites high capacity, smooth operation, and low maintenance as advantages of the screen.

Rotameter Kit for Research Laboratories

Brooks Rotameter Company, Lansdale, Pa., has announced a rotameter kit for measuring low flow rates in laboratory and pilot plant research. The kit consists of one fully-shielded rotameter case (as illustrated), four metering tubes that are readily interchanged in the case, and 16 spherical floats—four each in Pyrex, aluminum, stainless steel, and Monel. With this combination, 16 liquid flow ranges are obtained, starting at 0.2 cc per minute and reaching a maximum of 200 cc per minute. Also obtained are 16 ranges in gases, commencing at 10 cc per minute under standard conditions and extending to 7000 cc per minute.

With the addition of two larger tubes and four floats, the top range can be extended to 0.20 gpm of liquid and 0.60 cfm of gas. A base plate for a stand and hose connections also is obtainable, if desired.

Paper Coating Resin

A polyvinyl chloride paste forming resin, Geon 100-X-26, suggested by the manufacturer for paper coating application as well as other services, has been announced by B. F. Goodrich Chemical Company, Rose Bldg., Cleveland, Ohio. Available as a free flowing white powder with a specific gravity of 1.40, the resin may be formulated by either one of two methods. In one method, the resin is merely dispersed in a plasticizer by simple stirring; in the other, a volatile diluent is added to the resin-plasticizer mixture. (Straight chain aliphatics, just above

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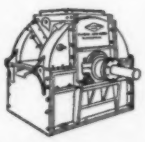

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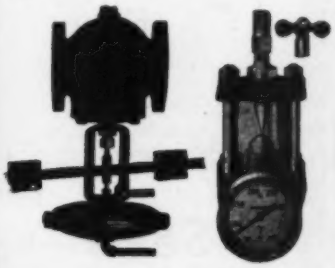
In Stickle Systems for automatic paper drying, drainage and control, in addition to accomplishing their individual purposes, are coordinated to achieve ultimate effectiveness in the complete system. Stickle Drainage removes all condensate and air from dryers to permit maximum dryer temperatures to be maintained. Stickle Control assists drainage by maintaining an exact differential between sections for proper drainage at all pressures. Together Stickle Drainage and Stickle Control permit a paper machine to produce at high capacity, assure uniform drying with negligible variation from predetermined moisture content, and save steam.

Stickle Control is available in Standard Automatic Control or Automatic Tension and Thermal Control. Stickle Drainage may be had in Stickle Individual Trap System, Stickle Differential Drainage, or Stickle Vacuum Differential Drainage.

(Left) Stickle Individual Trap System—Stickle Traps, designed for paper machine working pressures and adapted to specific working conditions, connected to all syphons. Supply constant visual check on operation of each syphon.



(Above) Automatic Differential Valve provides exact differential pressure between two sections of machine, insuring proper drainage at all pressures. Micro Adjustable Orifice (with or without thermometer) supplies visible operation of syphons when Stickle Differential Drainage is used.

(Left) Stickle Tension and Thermal Control automatically retards or accelerates steam flow according to need of sheet established by predetermined moisture content.

Information on Stickle Drainage and Control and other Stickle Equipment for improving paper mill operations and reducing the cost of steam is supplied in Bulletins No. 160 and 160-A.

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the gasoline range in molecular weight, are recommended as diluents.) Both methods of formulation require temperatures of 325 to 350 Fahr. for fusion of resin and plasticizer.

Electric Controller for Boiler Feed-Water

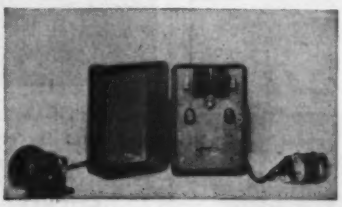
The *Micro-Netic* electric controller has been announced by J. H. Campbell Co., 645 East Wardlow Road, Long Beach 7, California, for the control of boiler feedwater. Weighing only 7½ lb., the controller can be attached to a boiler to occupy a space of 3½ in. by 7½ in. for its housing and 2 in. by 4 in. by 6½ in., for switch box.

The device embodies a round ball float of Monel, capable of resisting a pressure of 400 psi. This float carries a steel ring which attracts magnets when it comes into their fields. Alnico permanent magnets, capable of lifting 100 times their own weight, are used, as a Microswitch.

In operation, when the level of water in a boiler lowers to a pre-determined point, the magnetic action of the controller opens the water line; when the level rises to a certain point, the feed line closes automatically.

Electronic Positioning Control System

The Control Division of the General Electric Co., Schenectady, N. Y., has announced a new electronic positioning control system designed for such applications as accurately controlling inacessible dampers from control stations on the floor, positioning heavy work in machine



tools without time-consuming hand labor, and opening, closing, and adjusting to intermediate points valves and gates from a single co-ordinated control deck.

The system has three parts (See illustration—L to R)—a master control, an electronic panel, and a follow up device (either small selsyns or potentiometers depending on application). The driving motor is not included in the system because any reversing a-c or d-c motor that can handle the load is acceptable.

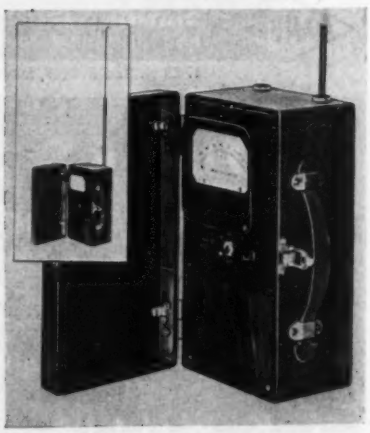
The master control station may be placed in any desired location. To operate, a dial is set in the same manner as a radio dial, and the motor moves the load to a new position corresponding to that of the dial.

The new system can be used on drives up to 1½ hp. in general, and on many drives over this rating, after consideration of inertia of the load, speed, gear reducer arrangement, and accuracy of positioning needs.

Static Detector

Davis Emergency Equipment Co., Inc., 399 Halleck St., Newark 4, N. J. has announced the *Statometer* as a portable self-contained electric instrument for use in the study of electrostatic conditions. The meter of the instrument, calibrated in terms of static volts, is sensitive enough to detect static charges on the order of fractional volts, either negative or positive. Provided with a 2-position range switch, it is possible to measure any voltage from zero to 750 volts.

There are two sockets on top of the instrument in which an air terminal is inserted. One socket is used for detecting a negative charge; the other, for a positive charge. If the air terminal is in the socket



for detecting negative charges and the meter needle moves down the scale instead of up, the static charge is positive and a change of the air terminal to the opposite socket is indicated.

With the operating switch turned on and the range switch turned to the low range position and balanced to zero, the needle of the meter will start to fluctuate upon bringing the instrument in the vicinity of a body charged with static electricity, thus indicating that the area has within it a charged body. Upon making this observation, the operator turns the range switch to the high range position and as the instrument is brought closer to the charged body the meter needle will move higher on the scale. The same procedure of operation is followed whether the static charge is negative or positive.

The instrument is 10¾ in. high by 4¾ in. deep by 6 in. wide. Its weight is 5 lb. 10 oz.

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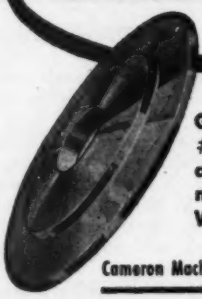

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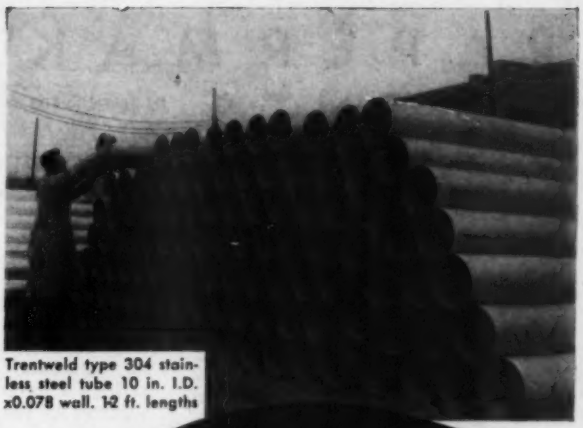
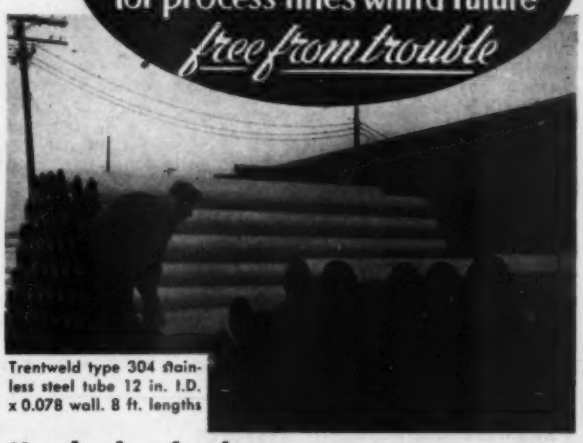


Trentweld type 304 stainless steel tube 10 in. I.D. x0.078 wall. 12 ft. lengths

Trentweld STAINLESS TUBES for process lines with a future free from trouble



Trentweld type 304 stainless steel tube 12 in. I.D. x 0.078 wall. 8 ft. lengths

Hundreds of tubes . . . . . and every one's a Champion installation

Too often, process lines are the weakest link in the paper-making cycle—a condition that is readily understood by mill men who are endlessly shutting down or closing stock, white water or liquor lines for repairs.

Trentweld stainless steel tube (type 304) eliminates this irritating and constantly re-occurring expense, because Trentweld tube is highly resistant to erosion and corrosion. While it does cost more initially, this increase is picked up over and over again in the disappearance of line failures and wasteful shut downs. In addition, Trentweld tube is easy to work with. It is light in weight, simple to handle and install. Yet it is rigid, very strong and able to withstand repeated heating and cooling, including a high resistance to thermal shock.

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TRENTWELD STAINLESS STEEL TUBES

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TRENT TUBE MFG. CO.

District Offices New York, Chicago,

PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Apparatus for Breaking Foam

Patent No. 2,405,138. Louis E. Gates, Canton, N. C., assignor to The Champion Paper and Fibre Company, Canton, N. C., a corporation of Ohio. Original application May 20, 1941, Serial No. 394,382, now Patent No. 2,366,513, dated January 2, 1945. Divided and this application August 19, 1944, Serial No. 550,267. 12 Claims. (Cl. 252—361.)

1. A device for breaking foam, comprising: a rotatable paddle; means for rapidly rotating said paddle; a substantially imperforate target surrounding the path of rotation of said paddle and separated therefrom by a substantial clearance; means for removing foam from its parent liquid; and means for introducing a stream of said foam into the path of rotation of said paddle at a location intermediate the axis of rotation and the circumference of the path of said paddle.

Papermaking Apparatus

Patent No. 2,411,416. Frederick A. Dieckbrader, Toronto, Ontario, Canada, assignor to The Hinde & Dauch Paper Company, Sandusky, Ohio, a corporation of Ohio. Application October 6, 1943, Serial No. 505,169. 4 Claims. (Cl. 92—41.)

1. A device for continuously applying a layer of filling material to paper stock adhering to the underside of the felt during its travel between cylinders at the wet end of a cylinder paper machine comprising an applicator roll beneath the felt, means for maintaining a coating of filling material upon the surface of said roll, a suction box overlying the roll and extending transversely across the felt and engaging the top of the felt above said roll adjacent the point of engagement of the felt with said roll for maintaining a suction upon paper stock engaging said roll, a pressure roll parallel with the suction box and in engagement with the top of the felt adjacent the box, and means for simultaneously raising or lowering said pressure roll and suction box.

Papermaking Machinery

Patent No. 2,401,603. Alfred I. Black, Hartford City, Ind., assignor to Isabell Black, Hartford City, Ind. Application April 27, 1944, Serial No. 533,035. 4 Claims. (Cl. 34—120.)

1. In a drier apparatus including drier rolls, spaced anti-friction bearings provided on the sheave end of each of the drier rolls, said bearings of each roll being equidistant from the axis thereof, an annular carrier-sheave retained rotatively on said bearings, a head block secured to the end of one of the rolls and having a guideway directed toward the internal face of the sheave of that roll, and having a notch opening into the rear end of said block and a transverse offset thereat, a bolt loose in said guideway and having a lateral lug at its rear end to engage said notch and to protrude beyond the side face of said block, and means to urge said bolt projectively and also rotatively, whereby said bolt is pressed to engagement with said sheave to hold the latter against rotative movement and when retracted by a force externally applied to and dislodging the lug from said notch, is automatically turned into said offset and is there held in retracted position and disengaged from the sheave, and whereby when dislodged by a force externally applied to the lug dislodging it from said offset, is automatically projected to engagement with said sheave.

Jordan Engine Lining

Patent No. 2,409,453. Harold D. Stuck, Andover, and William W. Bolton, North Andover, Mass., assignors to John W. Bolton & Sons, Inc., Lawrence, Mass., a corporation of Massachusetts. Application July 5, 1941. Serial No. 401,066. 4 Claims. (Cl. 92—27.)

1. The combination with a frustro-conical Jordan engine backing; of a plurality of cutting members each member being bent to form sections, each cutting member being formed on its cutting edge with serrations, each serration having a straight edge disposed at an angle of less than thirty degrees with the general direction of the cutting member; and separating members between the cutting members and conforming to the shape thereof up to and including part of the serrations, the separating members being formed on their exposed faces in successive ripples, each ripple having a long face at a low angle with the edges of the cutting members and a short face at a high angle therewith.

Business and Economic Research

(Continued from page 890)

the country resounded with clamor from all left-wing groups for legislation to guarantee sixty million jobs? War plants were to be retained by the government for the manufacture of hundreds of products.

What legislation was actually passed? Laws that created two groups of economists to make long-range, objective studies and to report regularly—the Council of Economic Advisors reporting to the President and the Joint Economic Committee reporting to Congress. This was the program proposed by CED. It should prove far better than the pulling and hauling of business, labor, agriculture and politicians from which legislation has come in the past.

The CED is fighting for more than a high standard of living. For more than economic stability. CED is fighting for human freedom—real freedom. Opportunity for men to grow and develop to the limit of their capacity, materially, intellectually and spiritually, has existed and can exist only under democratic capitalism.

More than 40 billion people have lived since the dawn of the Christian era, and less than 1 billion of them have known the kind of freedom we are talking about—the kind of freedom Americans have enjoyed. Historically, freedom and democratic capitalism are a minority of one in forty.

The booklet by CED, entitled, "Freedom Has Its Price," is written around the thought that freedom cannot be bought for a lump sum but must be paid for in installments, with each generation paying its full share.

Reports of the research and policy division of the CED are publicized by the information committee, of which Walter D. Fuller, president of the Curtis Publishing Company, is chairman. The information committee operates through these nine principal channels: newspapers, business publications, magazines, radio, trade associations, chambers of commerce, libraries, universities and colleges, a mailing list of 30 thousand individuals who are considered leaders of thought in their communities or professions.

Among the CED research reports published by the McGraw-Hill Publishing Company, and now widely used in schools and colleges, are the following:

Production, Jobs and Taxes, by Harold M. Groves

International Trade and Domestic Employment, by Calvin B. Hoover

Agriculture in an Unstable Economy, by Theodore W. Schultz

Postwar Taxation and Economic Progress, by Harold M. Groves

Controlling World Trade-Cartels and Commodity Agreements, by Edward S. Mason

The latest policy statement of the CED is "Collective Bargaining: How to Make It More Effective." The accompanying book by Douglass V. Brown, professor of industrial relations, Massachusetts Institute of Technology, will soon be off the press.

I know that a great many of you men participated in the work of the field development division of CED. You helped to organize your communities to take up the slack when $60 billion of war contracts were terminated.

Keep up your interest. Support the work of the research and policy committee. The greatest tasks are still ahead. It is even harder to make men think than to make them act. And action not based on sound thinking is worse than useless.

Every one of you shares in policy making in your home town—in your industry. CED hopes to help you in working out thoroughly sound, constructive policies—policies that will enable America to withstand all destructive influences and attacks from without—policies that will enable the average family in America to double its standard of living in the next generation.

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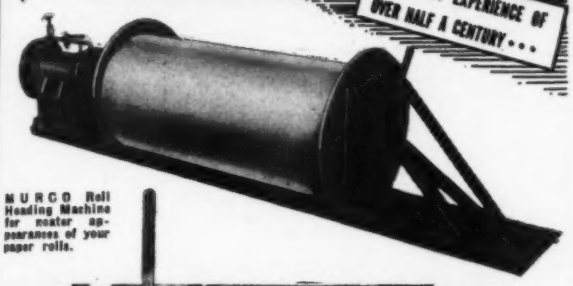

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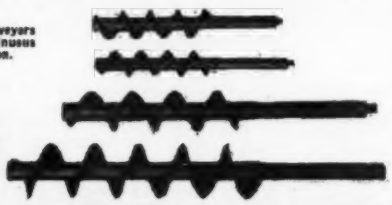

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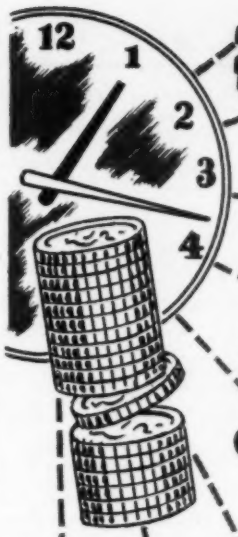

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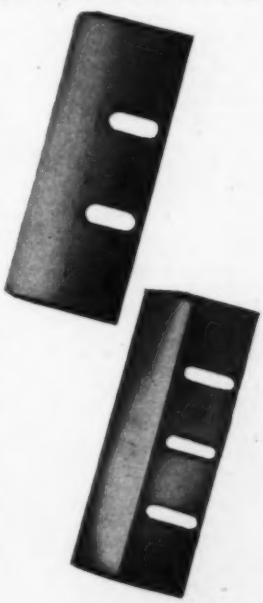

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New Catalogues and Publications

American Air Filter Company, Inc., 215 Central Ave., Louisville 8, Ky.—This company has just issued a new eight-page booklet on replaceable type air filters and their applications for ventilating and air-conditioning systems. Descriptions and illustrations of each type filter are given, along with instructions for maintenance and detailed engineering and installation data. The booklet is free on request from the company.

Automatic Transportation Company, 69 West 87th St., Chicago 20, Ill.—This company, manufacturer of the Transporter automatic electric hand truck, has issued a "Show Me" check off chart for the purpose of showing the more advantageous features and benefits of the Transporter as compared to other makes of hand trucks. There are also illustrations showing the various operating and safety features of the unit.

Chicago Metal Hose Corporation, Expansion Joint Div., Maywood, Ill.—Just issued by this company is Bulletin EJ-47, descriptive of CMH free-flexing and controlled-flexing bellows-type expansion joints for controlling expansion, vibration, and misalignment in pipelines having pressures of 300 psi and temperature to 900 Fahr. free- and controlled-flexing designs with copper and stainless steel corrugations are illustrated and data are given for each type. Make requests for the bulletin on company letterhead.

Clark Tructractor, 258 West Champion St., Battle Creek, Mich.—Under the intriguing title, "14 of the 101 Ways to Cash In on the Clark Truckloader," this new booklet describes the versatility of its 1000-lb. fork-lift truck for handling a wide variety of lift-haul chores common to most industrial plants. It is illustrated by action photographs showing the Tructractor at work in several manufacturing plants. A copy of the booklet may be obtained by request to the above address.

The International Nickel Company, Inc., 67 Wall St., New York 5, N. Y.—This company has just issued a new sixteen-page booklet on the materials required for the metal-arc, oxyacetylene, and submerged melt welding of nickel and the high nickel alloys. It lists such general information as the type of welding rods to use, recommended amperages for electric-arc welding, and the proper flux to select for gas welding and brazing. Information also is included on technical booklets on the subject of welding of the high nickel alloys and sources of supply for electrodes and gas welding wire. The book may be obtained without charge.

Kieley & Mueller, Inc., 2043 43rd St., North Bergen, N. J.—A new catalogue, running well over 100 pages, has just been issued by this company, manufacturer of the Kontrol Motor line of pressure regulators and diaphragm motor valves, and is made up of five sections covering, in addition to diaphragm valves, the company's line of liquid level controllers, strainers, pressure reducing and regulating valves, pump governors, and such steam plant equipment as back pressure valves, atmospheric relief valves, diaphragm relief valves, oil and grease extractors, and exhaust heads. The book, called catalogue 47, is designed as a working tool for engineers, and is liberally illustrated with over 250 cutaway views, performance charts, and tables. Distribution is limited to men in industry on request.

Lithgow Corporation, 333 West 40th Place, Chicago 9, Ill.—An entirely new brochure on protective coating and lining for steel and other metals is now available from the above company. Described in this illustrated eight-page catalogue are a wide range of Lithcote applications, plants and field facilities, research, reports of laboratory tests, and actual names of users. The catalogue may be obtained by writing the company.

Lombard Governor Corporation, Ashland, Mass.—A new folder under the heading "Lombard Variable Speed Reducer" has just been issued. The folder contains both operating and sectional photographs of the new unit, dimensions and characteristics tables, and explanatory sections devoted to its wide range, compact design, construction and speed adjustment. Bulletin VRS-23-16 may be obtained from the company on request.

Rapids-Standard Company, Inc., Grand Rapids 2, Mich.—A new gravity conveyor catalogue containing descriptions, photographs, and specifications of the company's entire line of gravity conveyors has just been issued by the above company, manufacturers of material handling equipment. The new catalogue will act as a companion piece to the power belt conveyor catalogue presentation in latest developments in the entire Rapids-Standard line of handling equipment. Copies of bulletin C-142-4 may be obtained by writing the company, Dept. RWC-224, 342 Peoples National Bank Building, Grand Rapids.

Surface Combustion Corporation, Toledo 1, Ohio—A colorful eight-page booklet entitled "Humidity Control Is More Important in Your Plant Than You May Realize," has just been published by this company, explaining the principle of operation and details of application of the Kathabar System of Selective Humidity control for industrial processing applications. There are illustrations of numerous installations for varied applications of dry air. The booklet is available on request.

Yarnall-Waring Company, Mermaid Lane, Philadelphia 18, Pa.—The eight-page Yarway bulletin on remote liquid indicators has been replaced by a sixteen-page issue with new information. In the new booklet there are some new details such as a description of the compensator and the control unit and its attachments, plus a lengthy description of the construction of the remote indicator. When writing ask for bulletin WG-1822.

Books

A. S. T. M. Standards on Paper and Paper Products (With Related Information)—This publication, dated October 1946, presents in latest form all of the 57 specifications, test methods, and related standards pertaining to paper and paper products that have been developed through the work of several A. S. T. M. technical committees, particularly Committee D-6 on Paper and Paper Products.

The specifications cover lime for cooking rags, quicklime, for sulphite pulp manufacture, waterproof paper for curing concrete, phenolic laminated sheet and round phenolic laminated tubing for radio applications, laminated thermosetting materials, and vulcanized fiber sheets, rods, and tubes for electrical insulation.

The test methods, many of which have been reviewed by a joint A. S. T. M.- TAPPI committee, cover such subjects as: pentosans in paper, grease resistance of paper, degree of staining of paper by alkali, kerosene number of roofing and flooring felt by the vacuum method, adhesiveness of gummed tape, flammability of treated paper and paperboard, penetration by water of sized paper and paper products (dry indicator method), printing ink permeation of paper (castor oil test), water vapor permeability of paper and paperboard, ply adhesion of paper or vulcanized fiber, edge tearing strength of paper, etc.

Bound in paper cover, and totaling 232 pages, the book has a page size of 6 in. x 9 in. It is priced at $2.00 a copy, the publisher is American Society of Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Contract Clauses for Cost-Conscious Employers—Edited by Stanley G. House, this paper-covered manual covers contract provisions and suggests procedures and policies for the guidance of management. The clauses treated in the text cover recognition, union security, management prerogative, grievance procedure, discharge, seniority, layoff, transfer, promotion, miscellaneous wage, and union activities. The price of the brochure is $2.25 a copy; its publisher Labor Relations Institute, 1776 Broadway, New York 19, N. Y.

Paperboard and Paperboard Containers: A History—Written by Harry J. Bettendorf, Vice President, Board Products Publishing Co., this book is divided conveniently into eleven chapters and an extensive bibliography. The subject titles of the eleven chapters are: Order from Chaos Through Paperboard Packaging; Early History of Paper and the Emergence of Paperboard; History of Board and Paper Machinery; Board Development in the United States; First Hand-Made Boxes in the United States; Development of Set-up Boxes; Development of Folding Boxes; Development of Corrugated and Solid Fibre Boxes; Development of Solid Fibre Boxes (by Emmons W. Bonfield); Development of Fibre Tubes and Cans; and Development of Fibre Drums, Pails and Barrels.

The appendix carries a list of early Philadelphia set-up box manufacturers, a list of New England set-up box manufacturers (1892-1904), a list of early suppliers to the set-up box industry, G. A. Shyrock's story of the first machine-made board, a list of early paperboard mills, a sketch of Henry D. Norris, early board specifications for corrugated boxes, a list of corrugated and solid fibre box manufacturers in World War I, and selected illustrations of early box styles reproduced from a catalogue of Sefton Manufacturing Co. which was published about 1911. Totaling 134 pages of text, printed on a page size of 8½ in. by 11 in., profusely illustrated, and bound attractively and durably in a red cloth stiff cover, the book is priced at $6.00 a copy domestic, $7.00 a copy foreign. The publisher is Board Products Publishing Co., 228 North La Salle St., Chicago 1, Ill.

Starch for Paper Coating (TAPPI Monograph Series—No. 3)—This paper-covered, 120-page (6 in. x 9 in.) monograph is the combined work of 22 authors. Its 21 chapters cover such subjects as: Chemistry of Starch in Relation to Its Use in Paper Coating; Starch Modifications; Physical Examination of Starch Products; Viscosity Determinations of Starch Dispersions; Preparation and Handling of Converted Starches; Enzyme Conversion for Paper Coating; Interchangeability of Starches and Other Adhesives; Methods of Application of Starch Coatings; Base Coating Formulas Using Starch as the Adhesive; Strength of Starch Coatings; Water Resistant Starch Coatings; Production of Corn, Tapioca and Potato Starches; Waxy Maize Starch, Sago Starch, Wheat Starch and Flour; and Viscosity Properties of Coatings. The price of the monograph to nonmembers of the Technical Association (copies having been distributed to members) is $5.00 a copy—$6.00 in Canada and other countries. Its publisher is the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y.

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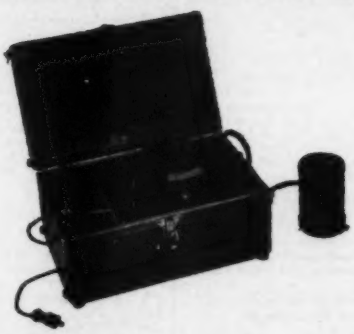

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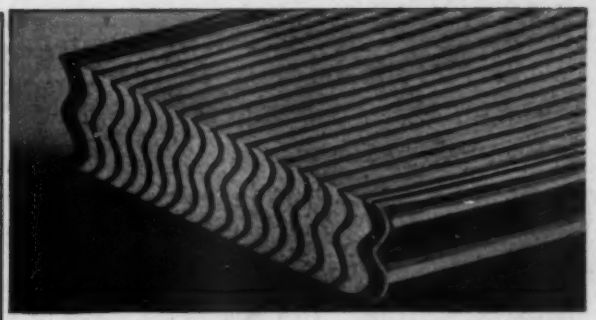

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FOR PERMANENTLY TIGHT JOINTS

GARLOCK GUARDIAN GASKETS are constructed of alternate layers of specially shaped strip metal and asbestos. Additional layers of metal are electrically welded together on the inner and outer edges. Result—a very strong gasket that's also *resilient*. Because of its unique structural design, the gasket compresses and rebounds instantly and repeatedly to conform with expansion and contraction due to temperature changes or vibration. Permanently tight joints under severe service conditions are assured.

Since metal and asbestos are the only materials used in their construction, Garlock Guardian Gaskets are unaffected by extreme temperatures and pressures. Also they effectively resist gases and liquids which cause many gaskets to disintegrate, as the double thickness of metal on the inner and outer edges forms an impregnable barrier to the destructive action of gases and liquids. Furnished in a wide range of sizes and shapes.

Garlock Guardian Gaskets with *centering rings* are available for raised face pipe flanges and other applications.

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PALMYRA, N. Y.

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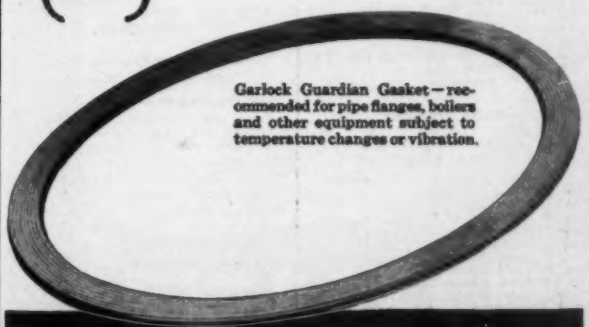

Garlock Guardian Gasket—recommended for pipe flanges, boilers and other equipment subject to temperature changes or vibration.

GARLOCK *Guardian* GASKET

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

(All Prices Are Nominal)

	per cwt.
Blue Overalls	8.50 to 9.00
Corduroy, Men's	4.50 to 5.00
Corduroy, Ladies'	4.50 to 5.00
Washables, No. 1	5.00 to 5.50
Percales	7.00 to 7.25
Light Prints, No. 1	6.50 to 7.00
Khaki Cuttings—	
Bleachable	6.00 to 6.50
Unbleachable	5.50 to 6.00
New White Canvas	10.00 to 11.00
New Mixed Blacks	4.50 to 5.00
Canton Flannels, Bleached	10.50 to 11.00
Shirt Cuttings—	
New White No. 1	11.50 to 12.00
White Shrunk	9.50 to 10.00
Silesias No 1	8.50 to 9.00
New Unbleached	11.75 to 12.25
Fancy	6.25 to 6.75
Linen Cuttings—	
American	8.50 to 9.00
White	14.50 to 15.50
Grey	13.50 to 14.50

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

(All Prices Are Nominal)

	per cwt.
Roofing—	
No. 1	1.80 to 1.85
No. 2	1.70 to 1.75
No. 3 and No. 4	1.60 to 1.65
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.75 to 3.00
Miscellaneous	2.00 to 2.25
Whites, No. 1—	
Repacked	4.25 to 4.50
Miscellaneous	3.50 to 3.75
White, No. 2—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shapperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

(All Prices Are Nominal)

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	5.25 to 5.75
Wool Tares—	
Light	5.25 to 5.75
Heavy	5.50 to 6.00
No. 1 Scrap Bagging	4.75 to 5.00
Manila Rope—	
No. 1 large	6.50 to 6.75
No. 1 small	5.50 to 5.75
Sisal Rope—	
No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
New Burlap Cuttings	5.50 to 6.00
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	4.50 to 4.75
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

(All Prices Are Nominal)

	per ton
Shavings—	
Hard White Env. Cuts	150.00—
Hard White, No. 1	120.00—
Soft White, No. 1	100.00—
Soft White, One-cut	120.00—
Soft White, Misc.	90.00—
Fly Leaf, No. 1	55.00—
Fly Leaf, Wood, No. 1	45.00—
No. 2 Mixed Col. Woody	35.00—
Flat Stock—	
No. 1 Heavy Books and Magazines	25.00 to 26.00
Mixed Books	18.00 to 19.00
Ledger Stock—	
No. 1 White	75.00 to 80.00
No. 1 Mixed (Colored)	60.00 to 65.00
Manilas—	
New Env. Cuttings	130.00 to 140.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	80.00 to 85.00
Colored Manila Tab Cards	65.00 to 70.00
Kraft—	
New Envelope Cuttings	115.00 to 120.00
Tripled Sorted No. 1 100%	70.00 to 75.00
New 100% Cor. Cuts	65.00 to 70.00
No. 1 Old Assorted	50.00 to 55.00
News—	
White Blank	70.00 to 75.00
Overissue	29.00 to 30.00
No. 1 Baled	18.00 to 20.00
Old Corrugated Containers	32.00 to 34.00
New Corrugated Cuts	38.00 to 40.00
Mill Wrappers	32.00 to 34.00
Box Board Chips	14.00 to 15.00
No. 1 Mixed Paper	15.00 to 17.00

CHEMICALS

f.o.b. shipping point

(All Prices Are Nominal)

Alum (Papermakers)—	
Lump, cwt.	4.25—
Ground, cwt.	4.00—
Powdered, cwt.	4.40—
Blanc Fixe—	
Pulp, bulk, ton	$55.00—
Dry, barrels, pound	07.50—
Bleaching Powder—	
Drums, cwt.	2.75 to 3.25
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	31.00 to 32.00
80-100 mesh (bags), lb.	37.00 to 37.50
Argentine, lb.	
China Clay—	
Domestic Filler	
Bulk (mine) ton	8.50 to 15.00
Domestic Coating	
Bulk (mine) ton	12.00 to 32.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	1.60 to 1.65
Glue, (C.P.) drums, lb.	20½—
Litharge, powd., bbl., lb.	.17 to .17½
Rosin (Gum)—	
New York, per 100 lbs.	
E	7.80—
F	7.98—
G	8.00—
WW	8.41—
Rosin (Wood), carlots	6.35—
Salt Cake—	
Dom. bulk (wks) ton	22.00 to 24.00
Imp. bulks on dock—	
(Atl. ports) ton (Nom.)	25.00 to ——
Soda Ash—	
Bulk (works), cwt.	1.00 to ——
Paper Bags, cwt.	1.25 to 1.35
Barrels, cwt.	1.35 to 1.60
Soda (Caustic)—	
Solid, drums, cwt.	2.50—
Ground and flake, drums, cwt.	2.90 to 3.00
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	6.37—
Pearl, barrels, cwt.	6.37—
Paper (Sp.) bags, cwt.	6.37—
Powdered, barrels, cwt.	6.48—
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to —
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.06½ to .07
Calcium Pig., bbls., lb.	.06½ to .07
Zinc Sulphide, bbls., lb.	10.00 to 10.25

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

(All Prices Are Nominal)

Bleached sulphite, Swedish	160.00 to 167.50
Bleached sulphite, Finnish	165.00—
Bleached sulphite, dom.	120.00 to 125.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	130.00 to 150.00
Unbleached sulphite, Fin.	132.50—
Unbleached sulphite, dom.	115.00—
Unbleached kraft, Swedish	130.00 to 140.00
Unbleached kraft, Finnish	132.50—
Unbleached kraft, northern	112.50 to 125.00
Unbleached kraft, southern	90.00 to 120.00
Bleached sulphate, Swedish	160.00 to 170.00
Bleached soda, domestic	120.00 to 125.00
Sulphite screenings, dom.	55.00 to 60.00
Sulphate screenings, dom.	55.00 to 60.00
Groundwood, domestic and Canadian	75.00 to 80.00

PAPER

f.o.b. New York City

(All Prices Are Nominal)

Boards—	per ton
Binders	94.00—
Chip	90.00—
Chip, tube and can	95.00—
Chip, full blanding	97.50—
Chip, sgl. mla. lined	95.00—
Coated, white patent .016	120.00—
.020 and heavier	110.00—
Kraft liner	79.00—
Filled News	90.00—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	13.30—
B Grade E. F.	—
C Grade E. F.	—
D Grade E. F.	—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	18.60—
No. 2 Glossy	17.35—
No. 3 Glossy	17.00—
No. 4 Glossy	—
No. 2 Offset	14.75—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—

	per cwt.
(In Ton Lots)	
Extra 100% Rag	48.00—
100% Rag	41.00—
75% Rag	31.50—
50% Rag	27.50—
25% Rag	24.50—

Rag Content Ledger—

	per cwt.
(In Ton Lots)	
Extra 100% Rag	48.00—
100% Rag	41.00—
75% Rag	32.00—
50% Rag	27.00—
25% Rag	24.00—

Sulphite Bond—

	per cwt.
Air dry, watermarked	—
No. 1 watermarked	16.75—
No. 2 watermarked	16.00—
No. 4 watermarked	14.50—

Sulphite Ledger—

	per cwt. Zone 1
No. 1 watermarked	18.75—
No. 2 watermarked	16.75—
No. 4 watermarked	15.50—

Glassine (f.o.b. mill)—

	per cwt.
Embossed (25 lbs. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—

	per ton
Rolls, Standard (Contract)	90.00—
Rolls (Spot)	(Nominal)
Sheets	109.00—

Tissues (Carlots)—

	per ream
White No. 1	1.70—
White No. 2	1.60—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.85—
Manilla	1.50—
Napkins, semi-crepe (12¼ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M shts.) per cs.	7.50—
Toilet, Unbleached (M. shts.) per cs.	6.00—

Towels—

	per case
Bleached	4.75—
Unbleached	4.00—

Wrappings (Kraft)—

	per cwt.
Super-Standard	7.00 to 7.50
No. 1 Wrapping	6.50 to 7.00
Standard Wrapping	6.25 to 6.75
Standard Bag	6.25 to 6.75
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f.o.b. mill)

Bleached Papers—

	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only (10,000 lbs.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—

Envp. Mla., Sub. 16-40 (No. 1)	—
Envy. Mla. Sub. 16-28 (No. 2)	—
Envy. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B30 lb.	—
Grade A-22 lb.	—

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the 1946-47

PAPER AND PULP MILL CATALOGUE ENGINEERING HANDBOOK

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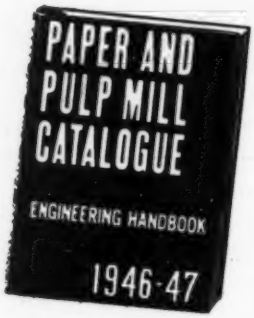

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Prominent manufacturers of pulp and paper mill equipment and supplies present in these descriptive pages important information about their products.

COMPLETE CROSS-INDEXED BUYER'S GUIDE

Complete cross-indexed buyer's service listing sources of purchase of machinery, equipment, chemicals and supplies and other important information.

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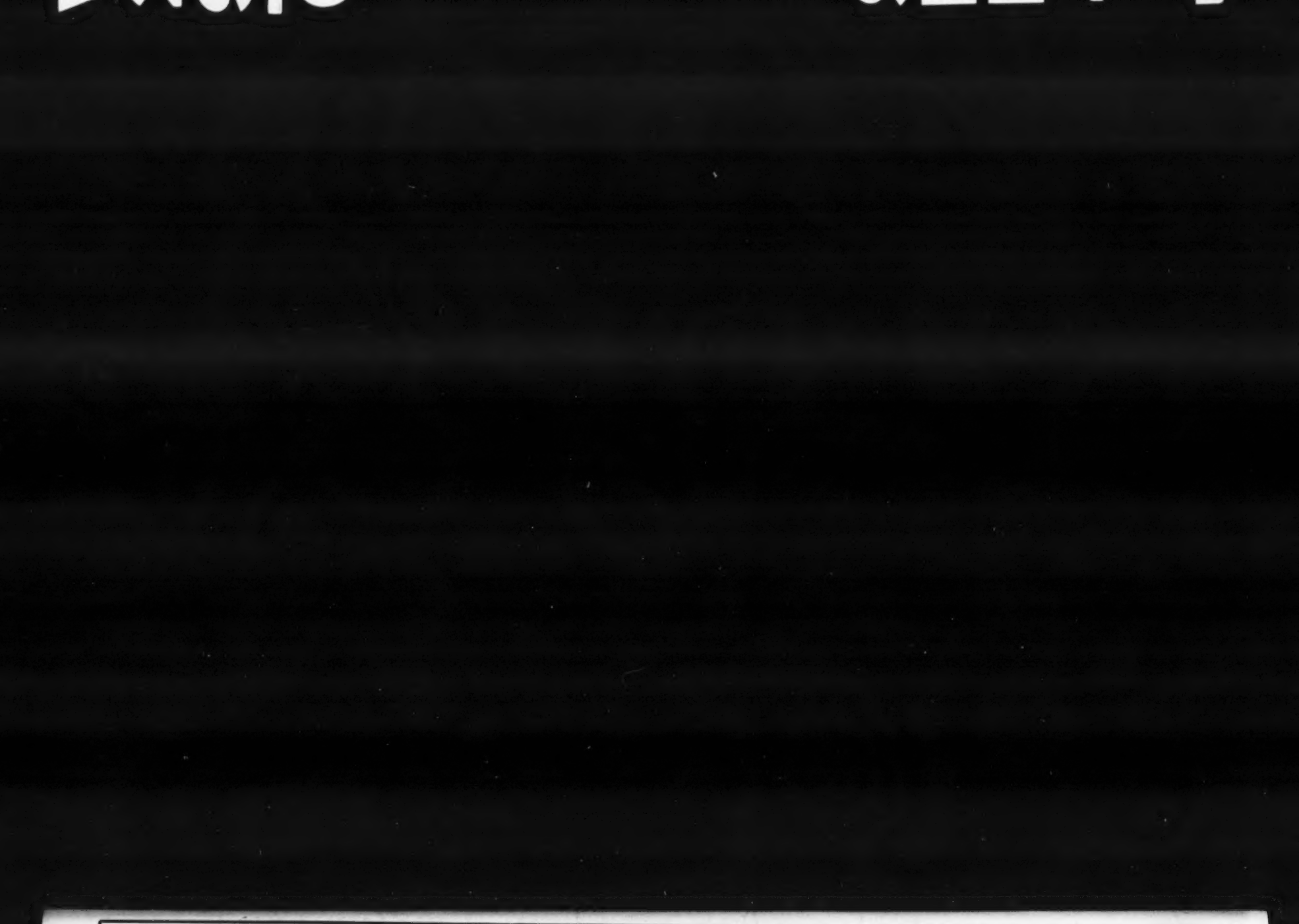

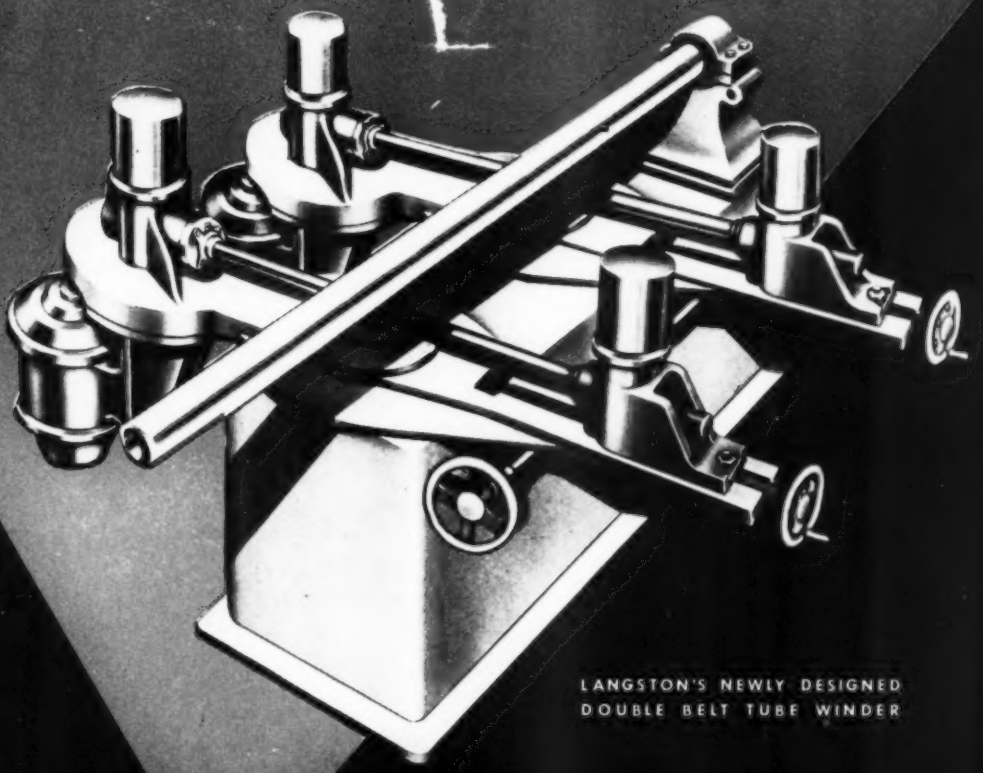

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DOUBLE BELT TUBE WINDER

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THIS NEW DESIGN, NOW IN PRODUCTION, MARKS FURTHER ADVANCES IN THE FLEXIBILITY, ACCURACY, DEPENDABILITY OF LANGSTON TUBE WINDING EQUIPMENT. BY OPERATING THE TWO BELTS AT *DIFFERENT SPEEDS*, IT IS POSSIBLE TO SYNCHRONIZE SPEEDS WITH THE DIAMETER OF TUBE UNDER EACH BELT. (PATENT APPLIED FOR.) BOTH THE SINGLE AND DOUBLE BELT TUBE WINDERS HAVE A GREATER RANGE IN DIAMETER – FROM ½" UP TO 13". FOR HIGH SPEED MACHINES, WHICH AUTOMATICALLY PRODUCE ACCURATELY CUT, CLEAN, UNIFORMLY WOUND TUBES – SPECIFY *LANGSTON*. SAMUEL M. LANGSTON COMPANY, CAMDEN, NEW JERSEY.

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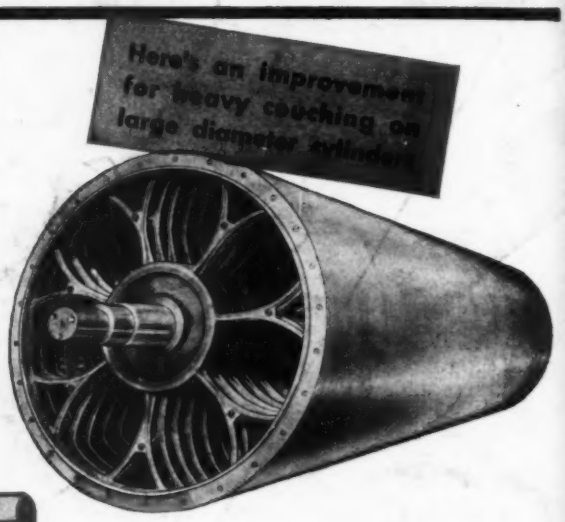
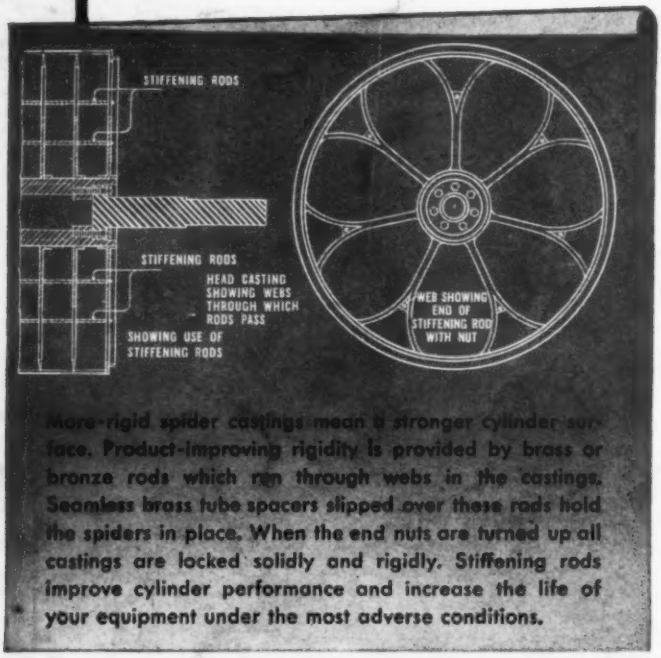
For Cylinder Mould Improvements

Your cylinder mould requirements are filled completely and satisfactorily when you bring your manufacturing problems to Cheney Bigelow. We are cylinder mould specialists — we strive constantly to build improvements into your cylinder moulds that will give you better performance, lower maintenance costs, more economical operation. One such improvement is the use of stiffening rods for large diameter cylinders which must stand up under the high stresses of heavy couching.




STIFFENING RODS
STIFFENING RODS
HEAD CASTING SHOWING WEBS THROUGH WHICH RODS PASS
SHOWING USE OF STIFFENING RODS
WEB SHOWING END OF STIFFENING ROD WITH NUT

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Cheney Bigelow Cylinder Moulds are constructed to your specifications of bronze, stainless steel type 316, carbon steel, or a combination of these metals, with patented high rod and flat wire surface construction or with round rods and wire. Investigate the exclusive Cheney Bigelow structural features which assure a true and rigid cylinder. Send for our folder which illustrates the unlimited varieties of Cheney Bigelow Cylinder Moulds that are ready to serve you. Cheney Bigelow Wire Works, 417 Liberty Street, Springfield, Mass.

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